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Koliko je maslina potrebno da...?
Valorizacija arheoloških
nalazišta u Starogradskom polju

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Starogradsko polje aktivni je ruralni krajolik, na kojem se tokom milenijskog kontinuiteta korištenja prostora respektirala njegova osnovna geometrijska struktura, postavljena u 4. st. pr. Kr. grčkom parcelacijom zemljišta. Osim nacionalne formalne zaštite krajolika, Polje je upravo zbog najbolje očuvane grčke podjele zemljišta (unutar koje se nalazi 90 zasad otkrivenih pojedinačnih arheoloških nalazišta te brojni ostaci etnološke baštine) i nepromijenjenog načina korištenja prostora upisano na UNESCO-ov popis svjetske baštine.

How many olives are needed to...?
Valorization of archaeological
sites in the Stari Grad Plain

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The Stari Grad Plain is an active rural landscape, where basic geometric structure, set in the 4th century BC by the Greek land division, has been respected over millennia of its continuous use. Precisely because of this best preserved Greek chora (within which 90 individual archaeological sites, as well as numerous ethnographic heritage remains, have thus far been discovered) and the unaltered use of this area, the Plain is scheduled national monument and also inscribed on the UNESCO World Heritage List.

Ovaj rad bavi se metodološkim okvirom za valorizaciju pojedinačnih arheoloških nalazišta unutar zaštićenog područja Starogradskog polja. Na prvoj razini predstavlja način obrade postojećih podataka o nalazištima i terenski rad kojim se stekao uvid u trenutno stanje baštine. Na drugoj razini donosi rezultate retrogradne analize kojom se detektiralo vrijeme i način nastanka promjena na vrjednijim nalazištima tijekom duljeg razdoblja, što je omogućilo revalorizaciju njihova stanja. Ovakvim pristupom, definirajući uzroke promjena i evaluirajući spremnost za njihovu sanaciju, omogućuje se ocjena uspješnosti provođenja politika zaštite baštine.

Rezultati analize stanja arheološke baštine unutar zaštićene zone Starogradskog polja, kao i krajolika u cjelini, ukazuju na potrebu za hitnom intervencijom, za čiju je provedbu neophodna suradnja službi za zaštitu spomenika od nacionalne do lokalne razine.

Ključne riječi: Starogradsko polje, valorizacija arheoloških nalazišta, retrogradna analiza nalazišta

This paper proposes the methodological framework for the valorization of individual archaeological sites inside the protected area of the Stari Grad Plain. At its first level, it describes a method of processing existing data about the sites and subsequent fieldwork which provided an insight into the current state of the heritage. At its second level, paper presents the results of a retrograde analysis which was used to detect the time and manner of the onset of changes at valuable sites over a longer period, which facilitated a re-assessment of their condition. Defining the causes of changes and evaluating the readiness to deal with them paves the way for an assessment of the success of heritage protection policies.

The results of an analysis of the condition of the archaeological heritage inside the Stari Grad Plain's protected zone, as well as the landscape as a whole, indicate the need for urgent intervention, in which cooperation between institutions for the protection of monuments from the national down to the local level is essential.

Key words: Stari Grad Plain, valorization, assessment of archaeological sites, retrograde analysis of sites

Uvod

Ovaj rad doprinosi temi zaštite Starogradskog polja, kojom se B. Kirigin desetljećima gotovo aktivistički bavio ukazujući na sve devastacije i nepravde nanesene tom vrijednom kulturnom krajoliku.¹ Poput jednog od mnogih Kiriginovih promišljanja u brojkama - *koliko bi stabala maslina moglo biti zasađeno na prostoru aerodromske piste u Polju i da li bi njihovo ulje donosilo veći doprinos nego povremeni (sportski) zračni promet?* - veći dio rezultata ovog rada² izražen je upravo brojkama.

Unutar geometrijske strukture Starogradskog polja nalaze se brojni arheološki ostaci koji ukazuju na aktivnosti koje su tijekom više tisućljeća vezane za obradu zemljišta Polja. Na Hvaru su 1988. i 1989. godine provedena sustavna rekognosciranja i različiti površinski pregledi kojima su identificirana i dokumentirana pretpovijesna i antička pojedinačna arheološka nalazišta, bilo da su nalazi ukazivali na postojanje gospodarskog objekta ili tek na aktivnost u prostoru. Da bi se stekao uvid u brojnost i vrstu arheoloških nalazišta unutar formalne zaštite Starogradskog polja te kako bi se omogućila valorizacija njihova stanja (osobito nalazišta s ostacima arhitekture), najprije su obrađeni postojeći podaci objavljeni u Registru nalazišta otoka Hvara.

Obrada postojećih podataka o arheološkim nalazištima na području Starogradskog polja

Registar arheoloških nalazišta na otoku Hvaru³ jedan je od rezultata sustavnoga terenskog rekognosciranja svih srednjodalmatinskih otoka u projektu *Adriatic Islands* (u nastavku teksta AI). O svakom pretpovijesnom i antičkom nalazištu Registar donosi uniformirane podatke o tipu i vrsti pronađenih ostataka, njihovoj dataciji, donosi opis zatečenog stanja, koordinatu središta nalazišta, podatke o veličini područja rasprostiranja materijala na površini te za neke i shematski nacrt. U objavljenoj karti nalazišta su ucrtana kao točke na slijepoj karti otoka u izuzetno

Introduction

This paper is a contribution to the subject of protection of the Stari Grad Plain, a topic with which Branko Kirigin has dealt almost activistically for decades, highlighting the devastations and injustices inflicted upon this valuable cultural landscape.¹ Like one of Kirigin's many considerations in numbers - *how many olive trees could be planted on the surface of an airfield in the Plain, and would their oil bring a greater economic contribution than occasional (recreational) air traffic?* - most of the results in this paper² are presented in numbers.

Inside the geometric structure of Stari Grad Plain, there are numerous archaeological remains that point to activities tied to the cultivation over the course of several millennia. Systematic reconnaissance and various field surveys were conducted on the island of Hvar in 1988 and 1989 which resulted in the identification and documentation of individual archaeological sites. Discovered finds indicated existence of farm buildings or different rural activities dating to prehistory and Antiquity. In order to obtain insight into the number and types of archaeological sites in the protected area of the Stari Grad Plain, and to facilitate the assessment of their condition (particularly sites with architectural remains), the existing data published in the Gazetteer of Archaeological Sites on the Island of Hvar were examined first.

Analysis of existing data on archaeological sites in the Stari Grad Plain

The Gazetteer of Archaeological Sites on the Island of Hvar³ was one of the results of the systematic sites and monuments survey of all central Dalmatian islands in the Adriatic Islands (hereinafter: AI) Project. For each prehistoric and Greco-Roman site, the Gazetteer contains consolidated data on the type of remains found, their dating, description of the current state of the monument, the coordinates for the centre of the site, the area over which finds were distributed

1 Npr. Skupina autora (*Mišljenja*) 1993.

2 Rad je dio dosad neobjavljene doktorske disertacije o temi monitoringa arheološke baštine Starogradskog polja. B. Kirigin je bio član komisije pri obrani doktorskog rada na Univerzi v Ljubljani 2016. godine, na čemu mu dodatno zahvaljujem. Rezultati su dijelom dobiveni i projektom monitoringa Starogradskog polja koji autorica ovih redaka provodi u sklopu rada Agencije za upravljanje Starogradskim poljem od 2011. do danas.

3 Gaffney *et al.* 1997.

1 E.g. Group of authors (*Mišljenja*) 1993.

2 This paper is part of a thus far unpublished doctoral dissertation on the topic of monitoring the archaeological heritage in the Stari Grad Plain. Branko Kirigin was a member of the commission hearing the doctoral dissertation defence at the University of Ljubljana, for which I am additionally grateful to him. The results were also partially obtained by the Stari Grad Plain monitoring project which this author is conducting as part of work by the Agency for Management of Stari Grad Plain from 2011 to the present.

3 Gaffney *et al.* 1997.

malom mjerilu što ju čini teško čitljivom, a time i neupotrebljivom na terenu.

Budući da je u planu objava još jedne knjige, dokumentacija terenskog rada projekta AI nalazi se kod pojedinih autora te nije bila dostupna. Dio podataka koji jest dobiven od istog projekta baza je podataka u tabličnom formatu.⁴ Ona sadrži opsežnije podatke od onih objavljenih u Registru nalazišta, od kojih su neki omogućili usporedbu današnjeg stanja nalazišta s onim otprije 25 godina. Između ostalog, navedeni su podaci o oštećenju nalazišta, upotrebi zemljišta na tom prostoru, postojanju terasiranja te eroziji.⁵

U Muzeju hvarske baštine, gdje se čuva dio baze podataka prikupljene projektom AI, na uvid su dobivene topografske karte mjerila 1:5000 u koje su sudionici projekta ručno ucrtavali obuhvate arheoloških nalazišta.⁶ Ti obuhvati determinirani su prema veličini rasprostiranja koncentracije pokretnog arheološkog materijala i arhitekturnih ostataka vidljivih na površini.

Da bi se omogućilo efikasnije upravljanje nalazištima prioritonom se pokazala potreba za izradom karte rasprostiranja arheoloških nalazišta koja će grafički jasnije prikazivati njihov smještaj te će posjedovati podatke o prostornom obuhvatu nalazišta, a ne samo o njihovoj središnjoj točki. U geografskom informacijskom sustavu (u nastavku teksta GIS) digitalizirani su podaci sva tri seta dobivenih podloga (centroidi objavljeni u Registru, centroidi *Excel* baze podataka i poligoni ucrtani u topografske karte), što je omogućilo njihovu korelaciju i prvu kontrolu točnosti podataka. Zamijećeno je da postoje nedosljednosti u ucrtanim lokacijama nekoliko nalazišta te da se bolje poklapaju podaci *Excel* baze s onima na terenskim kartama, dok su zamjetne razlike kod objavljenih podataka u Registru. Osim gotovo nezamjetnih nedosljednosti, gdje se različita pozicija središnje točke i dalje nalazi na istom nalazištu, na četiri lokacije došlo je do većih odstupanja (nalazištima s ostacima arhitekture - Jurkovića, Stagnjica, Moče te na nalazištu

on the surface and, for some, a schematic layout map. The sites were published as points on a blind map of the island at an exceptionally small scale, which makes them difficult to discern, and therefore useless in the field.

Since there are plans to publish one more book, the documentation from the AI Project fieldwork is in the possession of individual authors and not available. A portion of the data that was acquired from the same Project is a database in tabular format.⁴ It contains more extensive data than those in the Gazetteer of Sites, of which some allowed for a comparison of the current condition of sites with their condition over 25 years ago. Among other things, these are information on damage to the sites, the land use in this area, the existence of terracing, and erosion.⁵

Topographic maps with a scale of 1:5000, on which the project participants manually drew in extents of archaeological sites, were granted for viewing in the Hvar Heritage Museum, where part of the AI Project database is maintained.⁶ These extents were determined by the concentration of surface finds and architectural remains. In order to facilitate more effective management, the need to develop comprehensive map of the archaeological sites has become a priority. This map would graphically depict their location more clearly and contain data on the spatial extent of the sites and not just their central point. In the geographic information system (hereinafter GIS), all three sets of data (the centroids contained in the Gazetteer, the centroids in the Excel database and the polygons drawn onto topographic maps) were digitized, which facilitated their correlation and the first verification of the accuracy of data. It has been noted that there are differences in the locations of several sites between databases, and that the information in the Excel database corresponds better to those on the field maps, while the inconsistencies in the data contained in the Gazetteer are notable. Besides

4 Na ovome mjestu zahvalila bih Nikši Vujnoviću, sudioniku projekta AI, koji mi je omogućio pristup bazi podataka iz osobne arhive, kao i prijateljskoj podršci za vrijeme rada na otoku.

Baza je izrađena u Inštitutu za antropološke in prostorske studije pri ZRC SAZU u Ljubljani čiji su stručnjaci također bili članovi projekta AI.

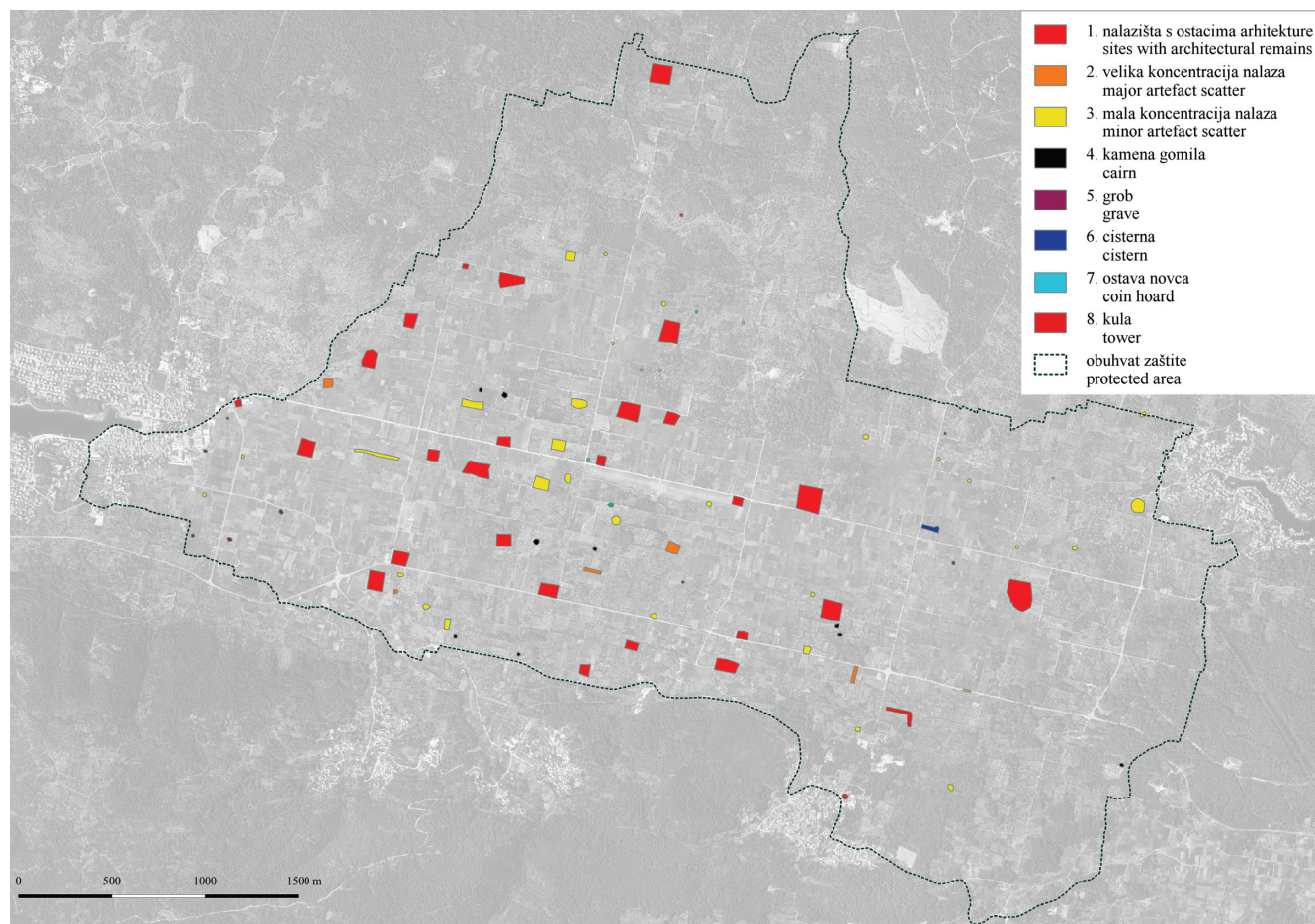
5 Iz navedenih podataka na žalost nije jasno koji su kriteriji uzimani u obzir pri determiniranju postojanja, a onda i samog stupnja jačine erozije.

6 Zahvaljujem Marinku Petriću koji mi je omogućio pristup ovim podacima, bez kojih daljnji rad ne bi bio moguć.

4 Here I would like to thank Nikša Vujnović, a participant in the AI Project, for granting me access to the database from his personal archives, as well as his friendly support during the course of work on the island. The database was compiled in the Anthropology and Spatial Studies Institute at the Research Centre of the Slovenian Academy of Arts and Science in Ljubljana, whose experts were participants in the AI Project.

5 It is unfortunately unclear from these data which criteria were taken into consideration to determine the existence, and then also the actual degree of the intensity of erosion.

6 I would like to thank Marinko Petrić, who granted me access to these data, without which this work would not have been possible.



Karta 1. Arheološka nalazišta u obuhvatu zaštite Starogradskog polja
Map 1. Archaeological sites in the protected area of the Stari Grad Plain

manje koncentracije keramike JE0047.007). Najveća diskrepancija postojala je za nalazište Gornje Moče, koje je u bazama podataka ucrtano u modularnoj jedinici C-10,⁸ dok je na terenskoj karti u jedinici C-15.

Budući da nije bio dostupan fotografski materijal snimljen za vrijeme terenskih rekognosciranja projekta AI, odluka o položaju nalazišta koji će poligonom biti ucrtani u karti (kasnije korištenoj pri monitoringu) donesena je nakon izlaska na teren i obilaska ucrtanih lokacija. Za Gornje Moče odlučeno je da je nacrt u terenskoj karti točniji od *Excel* baze i Registra zbog, između ostalog, samog toponima nalazišta koji se s njom podudara. Ta tvrdnja terenski nije mogla biti verificirana jer se na tom prostoru nalazi neprohodna visoka vegetacija. Nalazište koje se vodi pod

unnoticeable differences, where the different positions of central points are still found at the same site, there were major deviations at four sites (sites with architectural remains: Jurkovicica, Stagnjica, Moče and at a site with a minor artefact scatter JE0047.007). The greatest discrepancy was found in relation to the Gornje Moče site, which was drawn into modular unit C-10 in the databases⁸ but in unit C-15 on the field map.

Since the photographs taken during the sites and monuments survey of the AI Project were not available, the decision where to draw a site (polygon map later used in monitoring) was made after verification of the existing data in a field survey. In the case of Gornje Moče, it was decided that the drawing on the

7 Arheološka nalazišta u ovome radu imenovana su toponimom, a ako on nije naveden u Registru nalazišta otoka Hvara, preuzeta je šifra pod kojom je nalazište objavljeno.

8 U radu je preuzeto imenovanje modularnih jedinica antičke podjele zemljišta korišteno u površinskim pregledima projekta AI i kasnije, npr. Bintliff 1988; Mlinar 1997; Slapšak *et al.* 2001; Slapšak 2002.

7 The archaeological sites in this paper are designated by toponyms, and if these are not specified in the Gazetteer of Sites on the Island of Hvar, the codes under which they are registered were used.

8 The nomenclature for the modular units of the Greek land division used during field surveys for the AI Project and later were used in this work. E.g.: Bintliff 1988; Mlinar 1997; Slapšak *et al.* 2001; Slapšak 2002.

šifrom JE0072.00 jedini je slučaj u kojem se lokacija nalazišta, ucrtana na istome mjestu u sve tri baze podataka, na terenu pokazala krivom. Budući da su pronađeni ostaci antičke arhitekture koji odgovaraju opisu objavljenom u Registru, zaključeno je da je riječ o istom nalazištu čiji se nacrt lokacije mora izmjestiti 80-ak metara prema jugu, na susjednu, višu terasu.

Iscrtana je nova karta nalazišta (karta 1), koja je poligonska *shp* datoteka, te su za svaku lokaciju pridruženi atributi upisani u *Excel* bazi podataka. Na taj način dobiveni su podaci o 90 pojedinačnih arheoloških nalazišta unutar obuhvata zaštite Starograskog polja, koja su klasificirana na sljedeći način:

27 nalazišta s ostacima arhitekture - riječ je ostacima rimskih gospodarskih objekata;

5 velikih koncentracija nalaza - svojim karakterom mogle bi upućivati na postojanje antičkih arhitekturnih ostataka koji danas nisu vidljivi na površini;

34 manje koncentracije nalaza - sporadični nalazi upućuju na aktivnost u prostoru koja ne mora biti vezana za postojanje arhitekturnih ostataka;

9 kamenih gomila - definiranih kao tumuli, odnosno kameni grobni humci;

grobovi - unutar obuhvata 7 je položaja na kojima je nađen jedan grob ili više njih; na položaju Kučišće u dva su navrata zabilježeni nalazi grobova (grčkih pa rimskih) te su vođeni kao dvije katalogske jedinice, no ucrtane su na istome mjestu;

cisterna - antičkih cisterni ima više u Starograskom polju, no valja napomenuti da su dio većih arhitektonskih kompleksa (npr. vila na Prilogama, Podhum, Zahum, Carevac, Stagnjica, vila Poškujivac, Bonje smokve te objekti bez toponima, JE0072 i JE0081) te se vode pod nalazištima s ostacima arhitekture; kao izdvojeni objekti u Polju su zabilježeni ostaci jedne cisterne i jednog bunara građenog od opeke;

2 ostave novca - ni za jednu nije poznata točna lokacija;

kula - grčka kula na položaju Maslinovik.

Načini promatranja i dokumentiranja nalazišta

Pri izradi karte rasprostranjenosti nalazišta postalo je očito da su u obuhvatu zaštite Starograskog polja nalazišta koja posjeduju različit stupanj vrijednosti, i to ne samo po stupnju očuvanosti već i po vrsti arheološkog zapisa. Analiza stanja pojedinačnih arheoloških nalazišta obuhvatila je dokumentiranje stanja površine svih zabilježenih nalazišta u Polju. Ipak, razlike u pristupu, odnosno rezoluciji promatranja i dokumentiranja ovisile su o unaprijed postavljenim parametrima. Krenulo se od hipoteze da djelomično devastirani antički gospodarski objekti mogu nositi značajniji arheološki zapis u odnosu na dobro očuvan

field map is more accurate than the Excel database and the Gazetteer because, among other things, of the site's toponym to which it corresponds. This assertion could not be verified because the area is overgrown with impassably high vegetation. The site registered under code JE0072.00 is the sole case in which the location, denoted at the same place in all three databases, proved to be incorrect after field verification. Since the remains of Roman architecture which correspond to the description in the Gazetteer were found, its location must be moved approximately 80 meters southward, to the neighbouring higher terrace.

The new map of the sites (*shp* file drawn with polygons) was produced (map 1) with the adjoined attributes from the Excel database. Data on 90 individual archaeological sites inside the Stari Grad Plain protected area were obtained, and classified in the following manner:

27 sites with architectural remains - these are the remains of Roman farm buildings;

5 major artefact scatters - they may indicate the existence of Greco-Roman architectural remains that are not visible on the surface today;

34 minor artefact scatters - sporadic finds indicating activity in the area which need not be linked to the existence of architectural remains;

9 cairns (*gomila*) - defined as tumuli or stone grave mounds;

graves - inside the protected area there are 7 locations at which one or more graves were found. At the Kučišće site, finds of graves (Greek and then Roman) were recorded as two catalogue units but drawn in at the same location;

cistern - there are several Roman cisterns in the Stari Grad Plain, but it should be mentioned that they are part of larger architectural complexes (e.g. the villa at Priloge, Podhum, Zahum, Carevac, Stagnjica, Poškujivac, Bonje Smokve, and structures JE0072 and JE0081 without toponyms) and they are registered as sites with architectural remains. The remains of a cistern and a well build with bricks are recorded as separate structures;

2 coin hoards - the exact location is not known for either;

tower - a Greek tower at the Maslinovik site.

Site observation and documentation methods

When compiling the site distribution map, it became obvious that there are sites within the Stari Grad Plain protected area that have differing degrees of value not only in terms of their preservation but also in terms of the type of archaeological record. An analysis of the condition of individual archaeological sites included documenting of the surface condition

prostor na kojem je pronađena manja koncentracija keramičkog materijala. Iz tog razloga takva je prednost uzeta u obzir pri izradi modela za dokumentaciju stanja pojedinog tipa nalazišta. Tipovi koji su detaljno dokumentirani su nalazišta s ostacima arhitekture, prostori s većom koncentracijom pokretnih nalaza, pretpovijesne gomile, cisterne i grčka kula. Dosta jednostavnije pristupilo se dokumentaciji stanja nalazišta čija lokacija nije sigurna (grobovi, ostava novca) ili nije definirana kao izuzetno vrijedan arheološki zapis (manja koncentracija nalaza).

Prospekcija iz zraka i interpretacija aerofotografija

Za dokumentiranje stanja zaštićenog područja u cjelini najprije se pristupilo nadzoru iz zraka. Planom leta kojeg je cilj bilo dokumentiranje stanja površine cijeloga Starogradskog polja osiguralo se (osim analize trendova koji se manifestiraju u krajoliku) da ni jedno pojedinačno nalazište ne bude izostavljeno. Zbog brojnosti arheoloških nalazišta i odluke da se na ovaj način dokumentira stanje površine svih zabilježenih ostataka (čak i onih čija je lokacija možda netočna), jedino je ovakav plan leta mogao biti osmišljen. Razraditi pristup za ciljano dokumentiranje 90 lokacija iz zraka ne bi bilo moguće zato što se zbog geometrijske strukture Polja one nalaze u naizgled sličnim predjelima. Pritom valja imati na umu da - za razliku od nalazišta antičkih gospodarskih objekata koja su smještena u nizinskim krajolicima središnje Europe, a koja se (za vrijeme povoljnih uvjeta i više različitih ispunjenih parametara) iz zraka mogu detektirati u vidu markacije u vegetaciji, boji zemlje ili mikromorfologiji terena⁹ - u krajoliku definiranom suhozidnim strukturama iz zraka nije moguće razlikovati antičke arhitekturne ostatke od okolnog zemljišta. U ovom tipu krajolika svakim čišćenjem obradivog zemljišta od viška kamena materijal se odlagao na već postojeće zidane strukture.¹⁰ Zato se ostaci antičke arhitekture, kao i pretpovijesnih gomila, gotovo uvijek nalaze unutar novijih kamenih krčevina.

Analizom fotografija dobivenih prvim letovima determinirano je na koji se način koristi zemljište na kojem je 1989. u Registru zabilježeno rasprostriranje arheoloških nalaza. Definirano je koja se poljoprivredna kultura sadi na području obuhvata nalazišta te je li prostor na bilo koji način devastiran. Prvim pregledom fotografija utvrđeno je da neke kamene gomile navedene u Registru danas više ne postoje (JE0019 i JE0129) te su izbrisane iz karte današnjeg stanja

of all recorded sites in the plain. Nevertheless, the different approaches and the level of detail in observations and documentation were applied on the basis of parameters set in advance. The initial hypothesis was that partially devastated Roman farm buildings can contain more significant archaeological records than well-preserved areas in which minor artefact scatters were found. It is for this reason that such a preference was taken into account when developing a model for the documentation of the condition of individual types of sites. The types that were thoroughly documented are sites with architectural remains, areas with major artefact scatters, prehistoric tumuli, cisterns and a Greek tower. A far simpler approach was adopted for the condition of sites with uncertain location (graves, coin hoards) or sites not defined as an exceptionally valuable archaeological record (minor artefact scatters).

Aerial prospection and interpretation of aerial photographs

Aerial reconnaissance was conducted first to document the condition of the protected area as a whole. The flight plan, which had as its objective the documentation of the state of the Stari Grad Plain's entire surface, ensured (besides an analysis of trends manifesting themselves in the landscape) that not a single site was neglected. Because of the number of archaeological sites and the decision to document the condition of the surface of all recorded remains (even those with a possibly inaccurately specified location), only such a flight plan could be conceived. Developing an approach to the targeted documentation of 90 locations from the air would not have been possible because, given the geometric structure of the Plain, they are situated in apparently similar areas. Here it should be noted that as opposed to the sites of ancient farm buildings of Central European lowlands, which (under favourable conditions and with a number of parameters fulfilled) may be detected through vegetation markers, soil markers or the micro-morphology of the terrain,⁹ in a stony landscape it is impossible to distinguish ancient architectural remains from surrounding land. In this type of landscape, any clearing of surplus stones from arable land involves the deposition of this material onto already existing walls.¹⁰ This is why the remains of ancient architecture, like prehistoric mounds, are almost always found beneath more recently cleared stones.

9 Npr. Musson *et al.* 2013, str. 60-76.

10 Novaković, Turk 1991.

9 E.g. Musson *et al.* 2013, pp. 60-76.

10 Novaković, Turk 1991.

poznatih arheoloških nalazišta. Nalazišta s ostacima arhitekture nisu brisana iz karte bez obzira na stupanj devastacije koji je na njima dokumentiran, i to zato što ne mora nužno značiti da su svi arhitektonski ostaci odstranjeni, kao što je to npr. utvrđeno na nalazištu Ivončeve njive nakon niveliranja za gradnju aerodromske piste.

Terenski pregled rezultata interpretacije aerofotografija

Analiziranjem aerofotografija dobiveni su preliminarni rezultati o stanju nalazišta, ali i definirani prohodni pristupni putovi za terenski obilazak arheoloških nalazišta. Iako se zaključilo da je većina lokacija zarasla u gustu vegetaciju, ipak ih se sve odlučilo terenski pregledati.

Terenski je pregledano 27 lokacija koje su u Registru klasificirane kao nalazišta s ostacima antičke arhitekture, 9 kamenih gomila, 2 antičke cisterne te grčka kula. Svako nalazište (kojem se moglo prići) opisano je i snimljeno geotagiranim fotografijama. Bilježeno je i da li na nalazištu postoji gradnja ili se na njemu odvija neka vrsta devastacije.

Na većini lokacija nisu vršena nikakva preciznija mjerenja zbog izuzetno guste i visoke vegetacije. Iz tog razloga, nakon informacija dobivenih terenskim pregledom, odabrano je 9 nalazišta (2 gomile i 7 lokacija s ostacima antičke arhitekture) koje je bilo moguće detaljnije dokumentirati jer su se arhitekturni ostaci mogli detektirati.

Dokumentacija izradom fotogrametrijskih 3D modela

U državama koje imaju dulju tradiciju prospekcije iz zraka i analize aerofotografija trodimenzionalna dubina prostora analizirana je u svrhu određivanja odnosa arheološkog konteksta unutar topografskih značajki krajolika. U posljednjih nekoliko godina, naglim razvitkom i dostupnošću bespilotnih letjelica UAV-a (*Unmanned Aerial Vehicle*)¹¹ koje omogućuju snimanje s niže visine (*LAAP Low-altitude aerial photography*)¹² i kompjuterskih programa za poluautomatsko generiranje 3D modela,¹³ kompjuterska fotogrametrija doživjela je pravi procvat unutar arheološke zajednice.

Godine 2015. odabrano je 9 arheoloških nalazišta u Starogradskom polju s očuvanim/vidljivim

An analysis of the photographs obtained from the first flights determined the current use of the land on which the distribution of the archaeological finds was recorded in the Gazetteer in 1989. The analysis further determined the type of crops being cultivated on the sites and whether these areas had been devastated in any way. With the first inspection of the photographs it was concluded that certain cairns cited in the Gazetteer no longer exist today (JE0019 and JE0129) and they were removed from the map of known archaeological sites. The sites with architectural remains were not deleted from the map regardless of the degree of devastation documented on them. This is because such devastation doesn't necessarily mean that all architectural remains were removed, which was, for example, determined at the Ivončeve njive site after levelling to construct an airfield.

Verification of results of aerial photograph interpretation on the ground

The first results on the state of preservation of archaeological sites were obtained through aerial photograph interpretation and at the same time access paths for the field survey were defined. Even though the general conclusion was that most locations are overgrown with dense vegetation, the decision was nonetheless made to examine all of them.

Field inspections were conducted at 27 locations classified in the Gazetteer as sites with architectural remains, as well as 9 cairns, 2 cisterns and a Greek tower. Each site (that could be accessed) was described and geotagged photographs of them were taken. It was also recorded whether there are any buildings or constructions at a site and was the site subjected to any type of devastation.

No precise measurements were taken at most sites due to the exceptionally dense and high vegetation. After ground verification, because of visible architectural remains, 9 sites (2 cairns and 7 locations with architectural remains) were selected to be documented in higher detail.

Documentation by photogrammetric 3D models

In countries that have a longer tradition in aerial prospecting and aerial photography analysis, relationship between the archaeological context and the topographic characteristics of the landscape were analysed in three dimensions. Several years back, with the rapid development and availability of

11 Eisenbeiss 2009; Sauerbier, Eisenbeiss 2010; Neitzel, Klonowski 2011; Nex, Remondino 2014.

12 Verhoven 2009.

13 Verhoven 2011.

arhitekturnim ostacima koje je potrebno detaljno dokumentirati te je za svaki izrađen fotogrametrijski 3D model. Za ovaj način dokumentiranja stanja odabrano je 6 rimskih gospodarskih objekata (na položajima Kupinovik, Mirje, Carevac, Slavač, Orišac i Stagnjica), grčka kula na položaju Maslinovik i 2 pretpovijesne grobne gomile. Nalazišta su odabirana na način da se međusobno potpuno razlikuju prema nekoliko kriterija kako bi se utvrdio potencijal ovog načina dokumentiranja. Neka se nalaze u obrađenom dijelu Polja, dok su druga u zapuštenom, neka se nalaze u ravnici plodne zemlje, dok su druga na kamenitim, višim dijelovima. Nalazišta se razlikuju i po vrsti i stanju očuvanosti samih arhitekturnih ostataka, pa je odabran i jedan djelomično devastirani lokalitet. Birana su i s obzirom na razlike u stanju istraženosti - neka su djelomično iskopavana, dok na većini nisu vršena nikakva istraživanja.

3D modeli nalazišta u Starogradskom polju izrađeni su kompjuterskom fotogrametrijom koja je trenutno najadekvatniji dostupan način na koji se u ovom prostoru mogu dokumentirati građene strukture i njihov odnos spram topografije okolnog zemljišta. Budući da su modeli georeferencirani te su time postali mjerljiv podatak, na taj je način omogućena usporedba trenutnog stanja nalazišta s onim koji će se na isti način dokumentirati u sljedećim godinama. Mjerenje promjena u krajoliku moguće je i automatiziranom detekcijom razlika između nekoliko 3D modela generiranih od podataka dobivenih različitim metodama. Na taj način moguće je komparirati modele dobivene iz povijesnih fotografija s trodimenzionalnim podacima istog prostora dobivenim LiDAR-om, odnosno laserskim skeniranjem površine iz zraka, koje bi valjalo za Starogradsko polje provesti u bliskoj budućnosti.¹⁴

Evaluacija trenutnog stanja nalazišta

Iako glavnu geometrijsku strukturu Polja čini podjela zemljišta datirana u grčko razdoblje, na 90 dokumentiranih arheoloških nalazišta gotovo i nema ostataka grčke arhitekture. Osim rijetkog pokretnog materijala te nalaza nekoliko grčkih grobova i nadgrobni spomenika, u prostoru Polja nalazi se kula na Maslinoviku (JE0120). Ona je s kulom na Toru (JE0157) i utvrđenjem na Purkinu kuku (SG0015) (oba nalazišta ostala su izvan obuhvata zaštite) činila sustav obrane Starogradskog polja.¹⁵ Kula na Maslinoviku u cijelosti je očuvana u tlocrtu do visine od 2–3 reda blokova. Istraživana je 1980-ih godina te ponovno 2011., 2012. i 2016. godine. Kula i ostaci

unmanned aerial vehicles (UAVs)¹¹ that enable low-altitude aerial photography (LAAP)¹² and software for the semi-automated generation of 3D models,¹³ there was a genuine blossoming of computer-based photogrammetry inside the archaeological community.

In Stari Grad Plain in 2015, 9 archaeological sites with preserved/visible architectural remains were selected for thorough documentation and a photogrammetric 3D model was made for each. Six Roman farm buildings (at Kupinovik, Mirje, Carevac, Slavač, Orišac and Stagnjica), a Greek tower at Maslinovik and two prehistoric tumuli were selected for this method of documenting their condition. The sites were deliberately selected to differ from one another as much as possible in terms of several criteria in order to confirm the potential of this type of documentation. Some are situated in the cultivated area, while others are abandoned; some are in the fertile lowland, while others are at stony, higher areas. The sites also differ in terms of the type and degree of preservation of the architectural remains themselves, so even a partially devastated site was selected. They were also selected in terms of the differences in the level of research done at them: some are partially excavated, while most had not been subject of any research.

3D models of the sites in the Stari Grad Plain were made by computer-based photogrammetry which is currently the most adequate available way in which built structures and their relationship to the topography of the surrounding land in this area can be documented. Since the models are georeferenced, thereby becoming measurable data, this method allows for a comparison of the current condition of the sites to the condition that will be documented in the same manner in subsequent years. Measurement of landscape change is also possible by means of automated detection of differences between several 3D models generated from data obtained by different methods. It is therefore possible to compare models obtained from historical photographs to three-dimensional data from the same area obtained by LiDAR, i.e., laser scans of the surface by air, which for Stari Grad Plain should be conducted in near future.¹⁴

14 Risbøl *et al.* 2015.

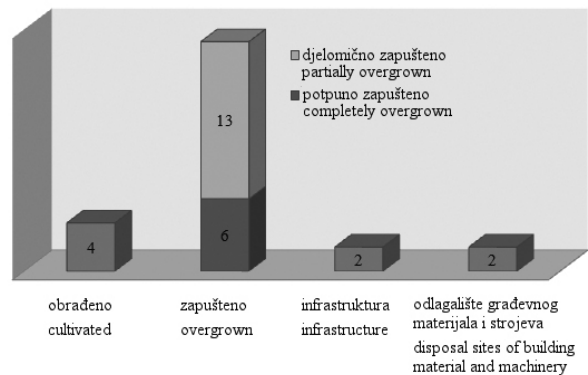
15 Kirigin 2004, str. 109-114.

11 Eisenbeiss 2009; Sauerbier, Eisenbeiss 2010, Neitzel, Klonowski 2011; Nex, Remondino 2014.

12 Verhoven 2009.

13 Verhoven 2011.

14 Risbøl *et al.* 2015.



Grafikon 1. Korištenje zemljišta na prostoru obuhvata nalazišta s ostacima rimske arhitekture

Chart 1. Land use on the extents of the sites with remains of Roman architecture

rinskoga gospodarskog objekta na Kupinoviku jedina su nalazišta u Starogradskom polju koja se planiraju prezentirati posjetiteljima.

Najbrojniji arheološki ostaci u Polju datirani su u rimsko razdoblje. Na 27 lokacija zabilježeno je postojanje nalazišta s ostacima arhitekture te navedeno još jedno (za koje postoje svjedočanstva stanovnika) čija točna pozicija nije poznata (Vrbanj JE0095). Od navedenih 27 nalazišta na njih 20 su 1989. godine (za vrijeme izrade Registra arheoloških nalaza otoka) identificirani i dokumentirani ostaci antičke arhitekture. Na ostalih 7 dokumentirani su pokretni nalazi keramike i građevinskog materijala poput tegula i kamenih klesanaca koji ukazuju na postojanje građenog objekta. Od 20 nalazišta s ostacima arhitekture na 6 lokacija radi se o rimskoj cisterni, dok se na ostalima nalaze zidovi prostorija. Na 3 nalazišta (Stagnjica, Carevac i Mirje) nalaze se ostaci zidova i cisterni. Dva se nalazišta u Registru ne vode pod kategorijom nalazišta s ostacima arhitekture iako su arhitekturni ostaci dokumentirani. Na položajima Biličice i Lokva također se nalaze cisterna i antički bunar, no smatraju se izdvojenim gradnjama gdje se ne očekuje postojanje gospodarskog objekta. Zbog guste vegetacije oni nisu pronađeni za vrijeme terenskih obilazaka.

Danas se gotovo na svim nalazištima s ostacima antičke arhitekture odražava trend koji zahvaća područje cijeloga Starogradskog polja, a to je napuštanje obradivog zemljišta. Pri određivanju stanja zemljišta na kojima se pružaju arheološka nalazišta utvrđeno je da su većinom zarasla u gustu neprohodnu vegetaciju (grafikon 1). Od 27 nalazišta ovog tipa 19 ih je zaraslo u gustu vegetaciju, od kojih na 7 lokacija vegetacija prerasta u šumu ili već jest šuma. Na samo 4 lokacije prostor se u cijelosti obrađuje i u svim slučajevima

Evaluation of the current state of preservation of the sites

Even though the basic geometric structure of the Plain consists of a land division dating to the ancient Greek period, there are almost no remains of Greek architecture among the 90 documented archaeological sites. Besides rare pottery finds, and several Greek graves and gravestones, there is also a tower at Maslinovik (JE0120). Together with the tower at Tor (JE0157) and the fortification at Purkin kuk (SG0015) (both sites are outside of the protected area), it formed the Stari Grad Plain's defence system.¹⁵ The tower at Maslinovik has been entirely preserved in its ground layout up to a height of 2-3 rows of blocks. It was excavated in the 1980s and again in 2011, 2012 and 2016. The tower and the remains of the Roman farm building at Kupinovik are the sole sites in the Stari Grad Plain which are being prepared for presentation.

The most numerous archaeological finds in the Plain have been dated to the Roman period. The existence of sites with architectural remains has been documented at 27 locations, and one more has been noted (for which there is testimony by local residents), although its exact position is not known (Vrbanj JE0095). Out of these 27 sites, the remains of Roman architecture were identified and documented at 20 of them in 1989. At the remaining 7, pottery finds and construction materials such as tegulae and dressed stones indicating the existence of buildings were documented. Among the 20 sites with architectural remains, Roman cisterns are at 6 sites, while the others have remains of the walls. Three sites - Stagnjica, Carevac and Mirje - have the remains of walls and cisterns. Two sites in the Gazetteer are not in the category of sites with architectural remains, even though they were documented. These are a cistern and well dating to Roman period found at the Biličice and Lokva sites. They are considered isolated structures where the existence of farm buildings is not expected. Due to dense vegetation, they were not found during the field surveys.

Today a trend which has taken hold of the entire area of the Stari Grad Plain, the abandonment of arable land, is reflected at almost all sites with architectural remains. When establishing the condition of the land on which archaeological remains extend, it was determined that most of it is overgrown with dense, impassable vegetation (Chart 1). Out of the 27 sites of this type, 19 are overgrown with dense vegetation, and among these 7 locations have vegetation that is

15 Kirigin 2004, pp. 109-114.

zasaden je maslinama.¹⁶ Zasad nije poznato koliko štete korijen masline nanosi arhitekturnim ostacima koji nisu vidljivi na površini. Zbog teške prohodnosti terena teško je govoriti o stanju pojedinih ostataka arhitekture jer se oni na mnogo nalazišta ne vide pod gustom vegetacijom. Kula na Maslinoviku također je na prostoru koji se ne obrađuje, no budući da se nalazi u kamenitijem dijelu Polja i da se povremeno održava, ovdje vegetacija nije neprohodna.

Od navedenih 20 lokacija gdje su 1989. zabilježeni ostaci antičke arhitekture, njih je terenskim obilascima 2013., 2014., 2015. i 2016. pronađeno i dokumentirano 14. Dva nalazišta srušena su prilikom starijih infrastrukturnih izgradnji, a na položaju Zahum nije utvrđena točna lokacija antičke cisterne. Na 3 su nalazišta (Stipanica, Slovči i Munjače) zbog dugotrajne zapuštenosti prostora ostaci građevine danas potpuno skriveni u gustoj vegetaciji.

Nalazišta na kojima se i danas uočavaju ostaci antičkih zidova su Moče, Stagnjica, Slavač, Kupinovik, Mirak, Orišac i Mirje. Na posljednjem je očuvano više različito građenih zidova, od kojih je jedan sačuvan u visini od 4,5 metara s rupama za grede pod gornjeg kata, čineći ga najimpozantnijim ostatkom antičke arhitekture u Starogradskom polju. Očuvane cisterne nalaze se na lokalitetima Poškujivac, Stagnjica, Carevac, Podhum, Bonje smokve, Priloge i JE0081. Stanje samih arhitekturnih ostataka kao i čestica zemlje na kojima se oni nalaze uvelike se razlikuje.

Retrogradna analiza

Jedini način kojim se može evaluirati očuvanost arheoloških nalazišta, kao i definirati vrste promjena koje su se na njima dogodile u određenom razdoblju, omogućuje analiza i komparacija današnjeg stanja nalazišta s onim zabilježenim na povijesnim fotografijama. Za svako arheološko nalazište valorizirano kao iznimno vrijedno definirano je postoji li u njegovu obuhvatu (definiranom veličinom rasprostiranja koncentracije pokretnog materijala na površini zemlje) devastacija ili gradnja, te je, ako postoji, uvidom u

becoming or has already become a forest. Only 4 locations are being entirely cultivated, and in each case olive trees have been planted.¹⁶ Thus far, there is no information on the extent of the damage caused by olive tree roots to architectural remains not visible at the surface. Due to the low accessibility of the terrain, it is rather difficult to say anything about the state of individual architectural remains because at many sites they cannot be seen under the dense vegetation. The tower at Maslinovik is also in an area that is not being cultivated, but since it is in a stony part of the Plain and occasionally maintained, the vegetation there is not as difficult to negotiate.

Out of the 20 locations at which architectural remains were recorded in 1989, 14 were found and documented in field surveys in 2013, 2014, 2015 and 2016. Two sites were demolished during earlier infrastructure development, while the exact location of the cistern at Zahum has not been defined. At 3 sites, Stipanica, Slovči and Munjače, the architectural remains are today entirely concealed in dense vegetation due to long-term neglect.

The sites at which the remains of ancient walls may be seen even today are Moče, Stagnjica, Slavač, Kupinovik, Mirak, Orišac and Mirje. At the latter one, several different constructed walls have been preserved, of which one stands at a height of 4.5 meters with preserved slots for the beams to bear the upper floor, making these the most imposing remains of antique architecture in the Stari Grad Plain. Preserved cisterns can be found at the Poškujivac, Stagnjica, Carevac, Podhum, Bonje smokve, Priloge and JE0081 sites. The condition of the actual architectural remains, like the plots of land on which they are situated, largely differ.

Retrograde analysis

The only way to evaluate the preservation of archaeological sites, and to define the types of changes which

16 Već je 1989. godine za 19 nalazišta navedeno da su prekrivena makijom ili stablima, na 6 je bilo obrađeno zemljište, na 1 izgrađena trafostanica, a još jedan se vodio pod ostalo. Uz ovaj podatak baza projekta AI donosi još jedan: kulturu koja se sadi na pojedinom nalazištu. Ona nije uspoređivana s današnjim stanjem jer očito postoji razlika u brojčanoj oznaci donesenoj u *Excel* bazi podataka i legendi objavljenoj u Registru nalazišta. Tako se za nalazište Slovči navodi da je zasaden agrumima, a na aerofotografiji iz istog vremena očito je da ne postoji ni jedno stablo na čestici. Slično se ponavlja i s drugim nalazištima.

16 Already in 1989, it was documented that 19 sites were covered with macchia or trees, 6 were on cultivated land, an electrical station had been built on one, and another was classified as 'other'. Besides these data, the AI Project database includes one more category: the crops cultivated at individual sites. It has not been compared to the current situation because there are obviously differences in the numerical code from the Excel database and the legends contained in the Gazetteer of Sites. Thus, it is noted that citrus fruit has been planted at the Slovči site, while the aerial photograph from that same time obviously shows that there is not a single tree there. Similar situations were repeated at other sites.

Ime nalazišta (toponim) i šifra u objavi	Godina promjene	Način i razlog promjene/uništenja	Narušene suhozidne strukture
Munjače JE0037	1980-ih	Izgradnjom državne ceste narušen je pojas uz južni rub nalazišta	NE
Stipanica JE0066	-	-	NE
Slovči JE0057	1960-ih	Proširenjem glavnog dekumana narušen je pojas uz južni rub nalazišta	NE
Kupinovik JE0069	prije 1944.	Gradnja kamene kućice	NE
Carevac JE0058	2009.	Odstranjivanje antičkih zidova pri poljodjelskim radovima	DA
	2007.	Gradnja kuće, uništavanje okoliša	
Moče JE0064	između 1967 i 1999	Ekstenzivna gradnja kojom se srušilo mnogo suhozidnih struktura	DA
Stagnjica JE0051	-	-	NE
Slavač JE0048	prije 1944.	Gradnja trima	NE
Knežine SG0030	1980.-ih	Gradnja poljske kućice (kasnije i skladišta) ukopavanjem u kamenu gomilu	DA
Bonje smokve JE0042	-	-	NE
Poškujivac JE0009	2000.	Za vrijeme sadnje maslinika srušene gomile i odstranjeni dijelovi podzida terasa (erozija)	DA
Mirje JE0028	2008.	Gradnja na nalazištu	NE
Ivončeve njive JE0030	1967.	Uništeno gradnjom aerodroma	DA
Jurkovića JE0036	-	-	NE
Starač JE0067	??	Gradnja temelja stupa dalekovoda	NE
Tinjak JE0024	1980-ih	Proširen je put uz sjeverni rub nalazišta	NE
JE0072	prije 1944.	Gradnja kamene kućice, gustirna ugrađena između antičkih zidova	NE
	2014.	Dijelom nalazišta vozi se automobilom	
JE0049	2008.	Za vrijeme gradnje kuće i pristupnog puta rušeni dijelovi suhozidnih struktura	DA
JE0035	2007.	Nivelacija dijela nalazišta i pretvaranje u deponij građevinskog i drugog materijala	DA
JE0081	1980-ih	Izgradnjom državne ceste narušen je pojas uz južni rub nalazišta	NE
Mirak JE0054	??	??	NE
Orišac JE0236	od 1980-ih do danas	Nivelacija dijela nalazišta i pretvaranje u deponij građevinskog i drugog materijala	DA
Zahum JE0078	1990-ih	Proširivanje puta uz nalazište	NE
	2005.	Iskop zemlje i zatrpavanje otpadom uz južni rub nalazišta	
Priloge BO0001	-	-	NE
Smirčić SG0001	od 1930-ih nadalje	Uništenje gradnjom i proširivanjem električne centrale	DA
Gornje Moče JE0063	-	-	NE
Podhum JE0080	1980-ih	Manje kopanje pijeska	NE
	2011.–2015.	Ekstenzivno kopanje pijeska na nižoj terasi	

Tablica 1. Opis i vrijeme nastanka promjena na arheološkim nalazištima

Name of site (toponym) and code in publication	Year of change	Manner of and reason for change/devastation	Damaged dry stone structures
Munjače JE0037	1980s	Southern edge of site damaged by construction of state road	NO
Stipanica JE0066	-	-	NO
Slovči JE0057	1960s	Southern edge of site damaged by expansion of main <i>decumanus</i>	NO
Kupinovik JE0069	before 1944	Construction of small stone house	NO
Carevac JE0058	2009	Antique walls removed during agricultural works	YES
	2007	Construction of house, destruction of environment	
Moče JE0064	between 1967 and 1999	Extensive construction during which many dry stone structures were demolished	YES
Stagnjica JE0051	-	-	NO
Slavač JE0048	before 1944	Construction of <i>trim</i> - dry stone shelter	NO
Knežine SG0030	1980s	Construction of small house (later also storage shed) by digging into cairn	YES
Bonje smokve JE0042	-	-	NO
Poškujivac JE0009	2000	During planting of olive grove, cairn demolished and parts of terrace support wall removed (erosion)	YES
Mirje JE0028	2008	Construction at site	NO
Ivončeve njive JE0030	1967	Destroyed by airfield construction	YES
Jurkovića JE0036	-	-	NO
Starač JE0067	??	Construction of foundation for power line pole	NO
Tinjak JE0024	1980s	Path along northern edge of site widened	NO
JE0072	before 1944	Construction of stone hut, recent cistern built between Roman walls	NO
	2014	Motor vehicles travel over part of site	
JE0049	2008	Parts of dry stone walls demolished during construction of house and access path	YES
JE0035	2007	Levelling of part of site and its transformation into a dumping site for building and other materials	YES
JE0081	1980s	Southern edge of site damaged by construction of state road	NO
Mirak JE0054	??	??	NO
Orišac JE0236	1980s to present	Levelling of part of site and its transformation into a dumping site for building and other materials	YES
Zahum JE0078	1990s	Widened road next to site	NO
	2005	Excavation of soil and filling with waste along southern edge of site	
Priloge BO0001	-	-	NO
Smirčić SG0001	1930s onward	Destruction caused by building and expansion of electrical station	YES
Gornje Moče JE0063	-	-	NO
Podhum JE0080	1980s	Some extraction of sand	NO
	2011-2015	Extensive extraction of sand on lower terrace	

Table 1. Description and time of onset of changes at archaeological sites

arhivske fotografije određeno kada je do nje došlo. Ovakva retrogradna analiza provedena je za obuhvate 27 nalazišta s ostacima antičke arhitekture, a korišteni su svi dostupni setovi aerofotografija prostora Starogradskog polja: 1944., 1952., 1968., 1986., 1999., 2003., 2005., 2007. i 2011.-2016.

Analiza promjena na arheološkim nalazištima obavljala se usporedbom podataka dobivenih terenskim pregledom i analizom stanja na navedenim fotografijama. Posebna pozornost pritom se pridavala detektiranju stanja suhozidnih struktura u obuhvatu nalazišta, i to zato što se u ovom tipu krajolika veći dio ostataka antičke arhitekture nalazi pod naknadno nastalim kamenim krčevinama. U većini slučajeva ne postoji znatnija razlika u značajkama suhozidnih struktura koje se nalaze na samom nalazištu (one naju biti nešto masivnije) i morfologije površine nekog drugog dijela krajolika u kojem nisu zabilježeni arheološki ostaci. Samim time ne postoji razlika u metodi kojom se retrogradno mogu pratiti promjene na pojedinom arheološkom nalazištu u odnosu na onu primjenjive za širi prostor Starogradskog polja.

Budući da je danas većina nalazišta pod gustom vegetacijom, stanje očuvanih suhozidnih struktura nije uvijek moglo biti determinirano, te se stoga nije moglo ni usporediti sa stanjem u nekom određenom trenutku. Ipak, analizom povijesnih fotografija pokušalo se determinirati da li se u obuhvatu nalazišta dogodila kakva promjena na suhozidnim strukturama prije nego što je nalazište obraslo u vegetaciju. Na takav način definirani su trendovi promjena i evaluirano je stanje svakog nalazišta.

Retrogradnom analizom pokušale su se utvrditi promjene koje su zadesile određeno nalazište i vrijeme njihova nastanka.¹⁷ Na taj se način, usporedo s utvrđivanjem trendova u prostoru, analizirala učinkovitost sustava mjera zaštite. Ujedno, ako su se promjene dogodile nakon 2008. godine, određeno je da li je, i kakav, efekt u prostoru generirao upis na Popis svjetske baštine.

occurred on them in a specific period, is to analyse and compare the current condition of the sites with those recorded in historical photographs. For each archaeological site defined as exceptionally valuable, it was determined whether or not its area (identified by the extent of surface finds) has been devastated or built upon, and if so, analysis of the archival photographs answered when this happened. Such a retrograde analysis was done for 27 sites with the remains of architecture, and all available sets of aerial photographs of the Stari Grad Plain were used: from 1944, 1952, 1968, 1986, 1999, 2003, 2005, 2007 and 2011-2016.

The identification of changes at archaeological sites was done by comparing data obtained from field surveys and the analysis of aforementioned photographs. Here particular attention was given to detecting the condition of dry stone structures on the sites, because in this type of landscape the majority of ancient architectural remains can be found beneath subsequently piled stones after land clearance. In most cases, there are no significant differences between dry stone structures at the site (they can be somewhat more massive) and the morphology of the surface of another part of the landscape in which no archaeological remains were recorded. Consequently, there are no differences between the methods used to retroactively monitor changes at individual archaeological sites and those applicable to the wider Stari Grad Plain.

Since most sites are today covered by dense vegetation, the condition of the preserved dry stone structures could not always be determined, and thus could not be compared to the condition at some earlier period. Nonetheless, an analysis of historical photographs served as an attempt to determine whether any changes on the dry stone structures had occurred on the site before it was overgrown with vegetation. Trends of changes were defined in this way, and the condition of each site was evaluated.

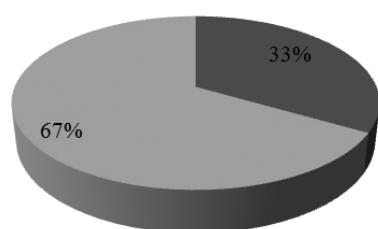
The retrograde analysis was an attempt to define the changes that had occurred at a certain site and the time of their origin.¹⁷ This way, parallel to the detection of the trends in the landscape the effectiveness of the cultural heritage protection system was analysed. Also, if the changes occurred after 2008, it was determined whether inscription on the World Heritage List had any impact on the landscape, as well as the nature of such impact.

Already during the creation of the archaeological topography of the island of Hvar in 1989 it was noted

17 Na isti način definirane su intervencije u prostoru poput nezakonitog odlaganja otpada, iskopavanja pijeska ili zemlje te gradnje kuće ili druge infrastrukture za područje cijeloga Starogradskog polja.

17 Interventions in the area such as illegal waste dumping, extraction of sand or soil and construction of houses or other infrastructure for the entire Stari Grad Plain were defined in the same manner.

- nalazišta na kojima su rušene suhozidne strukture
sites with destroyed dry stone walls
- nalazišta s nepromijenjenim stanjem suhozidnih struktura
sites with unchanged state of dry stone walls



Grafikon 2. Omjer dobro očuvanih nalazišta i onih kojima su rušene suhozidne strukture

Chart 2. Ratio between well-preserved sites and those on which dry stone structures have been demolished

Već se prilikom izrade arheološke topografije otoka Hvara 1989. godine napominjalo da se na mnogim arheološkim nalazištima događaju ili su se dogodile velike devastacije, da nekima prijeti devastacija zbog nezakonitih velikih iskopavanja zemlje ili različitih intervencija neposredno uz lokalitet. Već su tada, od spomenutih 27, infrastrukturnim zahvatima uništena dva rimska gospodarska objekta: Ivončeve njive gradnjom aerodromske piste i Smirčić izgradnjom elektrane.

Na lokacijama Stipanica, Slovči i Munjače, gdje nije bilo moguće potvrditi postojanje opisanih arhitekturnih ostataka u više terenskih obilazaka, pri retrogradnoj analizi pokušalo se utvrditi je li do trenutka njihova zarastanja došlo do promjene na suhozidnim strukturama koje se nalaze u obuhvatu nalazišta. Kao početna informacija o položaju građenih struktura uzeta je ona vidljiva na fotografijama iz 1944. godine. Pregledom svih raspoloživih fotografija došlo se do zaključka da Stipanica nije doživjela nikakve promjene. U suhozidne strukture Slovča i Munjača također se nije interveniralo, ali je uz oba nalazišta proširen put, odnosno izgrađena cesta (tab. 1).

Prema analizi povijesnih aerofotografija od 27 nalazišta s ostacima arhitekture samo na njih 8 nije došlo ni do kakve promjene u posljednjih 70 godina, osim eventualnog zarastanja prostora. Na još 10 nalazišta detektirane su različite intervencije u prostoru, ali one nisu rezultirale odstranjivanjem suhozidnih struktura s lokaliteta (grafikon 2).

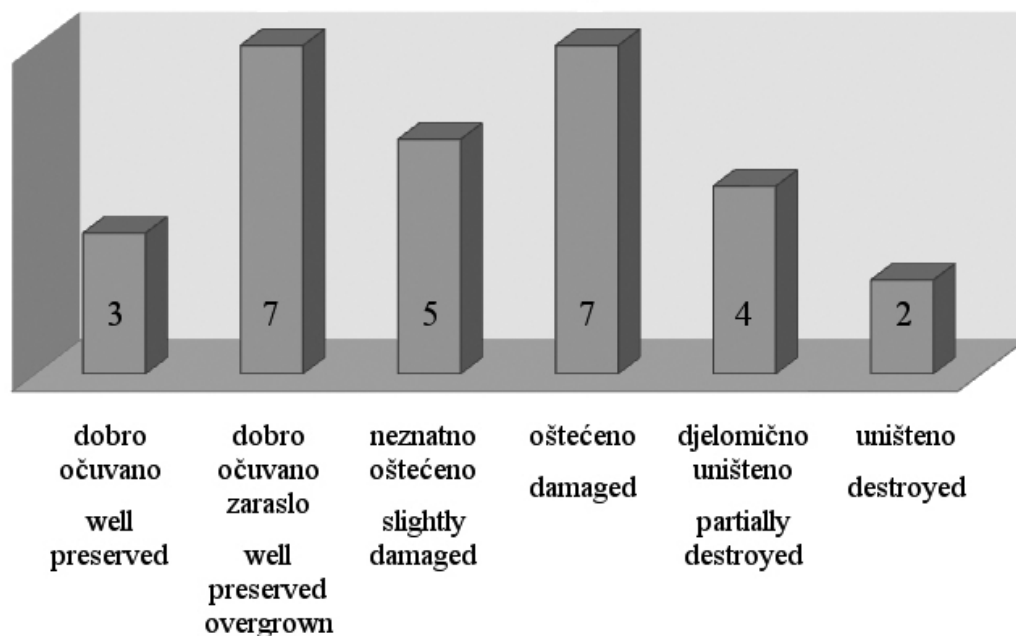
Proširivanje puta dogodilo se uz 5 nalazišta (uviijek u vremenu koje je prethodilo formalnoj zaštiti Starogradskog polja), a za tih radova nisu rušeni suhozidi u obuhvatu nalazišta. Na nalazištu Starač nije moguće sa sigurnošću utvrditi da nije došlo do promjena prilikom izgradnje dalekovoda jer ne posjedujemo fotografije tog dijela prostora iz 1986. godine. Veći dio

that many archaeological sites are considerably devastated, that some were threatened by devastation due to illegal large-scale soil extraction or various interventions that were located right next to a given site. Already at the time, out of the 27 mentioned, two Roman farm buildings were destroyed by infrastructure works: Ivončeve njive due to construction of an airfield and Smirčić due to construction of an electrical station.

At Stipanica, Slovči and Munjače, where it was not possible to ascertain the existence of the described architectural remains after several field surveys, the retrograde analysis served as an attempt to determine whether changes had occurred on the dry stone structures within the site's area prior to overgrowth with vegetation. The situation visible on photographs from 1944 was taken as the initial data on the position of the built structures. A review of all available photographs led to the conclusion that Stipanica had not undergone any changes. The dry stone structures at Slovči and Munjače also underwent no interventions, but the paths next to both sites were widened, i.e., roads were constructed (Tab. 1).

According to an analysis of historical aerial photographs of the 27 sites with architectural remains, only 8 of them endured no changes over the past 70 years, with the possible exception of being overgrown by vegetation. Various interventions were detected at 10 more sites, but they did not result in the removal of the dry stone structures from the site (Chart 2).

The widening of paths occurred next to 5 sites (always at the time that preceded the formal protection of the Stari Grad Plain), and the dry stone walls on the sites were not demolished during these works. At the Starač site, it is not possible to state with certainty that no changes were made during the construction of a power line pole, because we have no photographs of this area from 1986. Most of the demolition of dry stone walls at archaeological sites occurred because of some type of construction (infrastructure or private). Besides the construction of an airfield and an electrical station in areas where the archaeological remains of two villas were recorded, buildings of various sizes and purposes exist at another 9 sites where archaeological remains have been registered. A traditional small field shelter, known locally as *trim*, was built at the Slavač site, on a stone mound, while both the Kupinovik and J0072 sites each have an old small field house. They were built prior to 1944, so there is no way of knowing whether the dry stone walls were demolished during works, but this certainly was not done in the last 70 years. There is a small field house dug into a large cairn at Knežine, also built prior to the formal protection of the Plain. When the large housing complex at Moče was constructed cannot be



Grafikon 3. Stanje očuvanosti nalazišta s ostacima arhitekture
 Chart 3. Level of preservation of sites with architectural remains

rušenja suhozidnih ostataka na arheološkim nalazištima dogodio se zbog neke vrste gradnje (infrastrukturne ili privatne). Osim gradnje piste i trafostanice na prostoru gdje su zabilježeni arheološki ostaci dviju vila, na još 9 nalazišta s ostacima arhitekture postoje izgrađeni objekti različitih veličina i namjena. Na nalazištu Slavač na kamenoj je gomili podignut trim (tradicijski tip gradnje malog poljskog zaklona), na nalazištima Kupinovic i JE0072.00 podignuta je po jedna stara kamena poljska kućica. One su građene prije 1944. godine, pa se ne može utvrditi jesu li pri radovima rušeni suhozidni ostaci, no svakako nisu rušeni u posljednjih 70-ak godina. Na Knežinama je poljska kućica, ukopana u veliku kamenu gomilu, izgrađena također prije formalne zaštite Starogradskog polja. Za veliki kompleks kuća na Močama ne može se sa sigurnošću utvrditi kada je građen. Nije postojao 1968., dok 1999. jest, a ne posjedujemo fotografije iz 1986. za taj dio Polja. Pri gradnji tog kompleksa srušeni su mnogi suhozidi. Danas je kompleks zapušten. Na nalazištima JE0049.00, Carevac i Mirje nalaze se novije kuće izgrađene nakon formalne zaštite Polja i upisa na Popis svjetske baštine. Na Mirju pritom nisu rušene suhozidne strukture.

Suhozidi su odstranjivani na dva nalazišta (Poškujivac i Carevac) prilikom prilagođavanja terena modernijoj poljodjelskoj obradi. Na Poškujivcu su rušeni podzidi terasa u masliniku i postavljene gumene cijevi za navodnjavanje, a gustirna (očuvana do krune), koja se nalazi na sredini parcele, izložena je eroziji. Na Carevcu su pri radovima vađenja starih loza godine 2009. srušena dva antička zida dužine 4,5 m i 2 m,

stated with any certainty. It did not exist in 1968, but did in 1999, and we do not have that part of the Plain on the photographs from 1986. Many dry stone structures were demolished during its construction. Today the complex is abandoned. Newer houses were built at the JE0049.00, Carevac and Mirje sites after formal protection of the Plain and its inscription on the World Heritage List. The dry stone structures at Mirje were not demolished, however.

The dry stone walls were removed from two sites (Poškujivac and Carevac) during adaptation of the terrain to modern agricultural cultivation. In an olive grove at Poškujivac the terrace walls were demolished, rubber irrigation hoses were installed, and the cistern (preserved to its crown), situated in the middle of the plot, was exposed to erosion. Two antique walls with lengths of 4.5 m and 2 m were torn down at Carevac during removal of old grape vines in 2009, but at the order of the Conservation Department in Split, they were once more erected according to existing sketches.

The state of preservation for each site was defined on the basis of all gathered data. The categories were partially taken from the publication of the AI Project, which together with the Gazetteer of Sites also contains a brief overview of the condition of the monuments on the island of Hvar.¹⁸ Besides the categories of well-preserved, slightly damaged, damaged and destroyed,

18 Gaffney *et al.* 1997, pp. 41-49, see also Gaffney *et al.* 1993.

no po nalogu Konzervatorskog odjela u Splitu zidovi su ponovno sazidani po postojećim nacrtima.

Svakom nalazištu je na osnovi svih sakupljenih podataka definirano stanje očuvanosti. Kategorije su dijelom preuzete iz objave projekta AI, koji uz Registar nalazišta donosi i kratak pregled stanja spomenika na Hvaru.¹⁸ Uz kategorije *dobro očuvano*, *neznatno oštećeno*, *oštećeno* i *uništeno*, dodane su kategorije *dobro očuvano zaraslo* i *djelomično uništeno* (grafikon 3). Nalazišta kojima se danas zbog vegetacije ne može prići, a retrogradnom je analizom utvrđeno da prije zarastanja nisu doživjela veće promjene, svrstavana su u kategoriju *dobro očuvano zaraslo*. Djelomično uništenima smatrana su nalazišta na čijem se dijelu dogodila destrukcija, dok ostatak obuhvata nije morao doživjeti veće promjene. Gotovo sva uništenja na gomilama, osim onog na gomili Humić, detektirana su još 1989. godine, dok su na nalazištima s ostacima arhitekture novija oštećenja u podjednakom omjeru u odnosu na ona već dokumentirana.

Primjer retrogradne analize na nalazištu Orišac

Retrogradnom analizom nalazišta Orišac (sl. 1) mogu se utvrditi veće devastacije te se može detektirati vrijeme njihova nastanka. Nalazište je smješteno u blizini *omfalosa* i dobar je primjer na koji se način odvijaju promjene u nešto širem prostoru od onog na kojem se pružaju ostaci antičkog pokretnog materijala i arhitekture, koje se na njega izravno odražavaju. Orišac je nalazište na kojem su suhozidi nivelirani u svrhu i danas aktivnih deponija građevinskog otpada. Zbog zabrinjavajuće situacije koja se ne mijenja, uzet je kao eklatantan primjer neuspješnosti provedbe politika čuvanja kulturnog krajolika i/ili pojedinačnih arheoloških nalazišta s ostacima vidljive antičke arhitekture.

Na Orišcu, gdje je na manjoj površini (u odnosu na druge rimske objekte u Polju) od oko 2500 m² utvrđeno rasprostiranje rimskog pokretnog materijala i vršen intenzivan površinski pregled,¹⁹ promjene u sadnji kultura nisu dovele do većih promjena na građenim strukturama. Prva veća promjena na nalazištu dogodila se 60-ih godina 20. st., kada je proširen glavni dekuman.²⁰ Tada su srušene masivne suhozidne gomile koje su omeđivale sjevernu stranu puta. Time je nanensena prva znatna šteta, koja je onemogućila dobivanje odgovora na pitanje odnosa razine starijeg

the categories of well-preserved/overgrown and partially destroyed (Chart 3) were added. The sites which cannot be approached today due to vegetation, but have not undergone significant change as defined by retrograde analysis, were put into the well-preserved/overgrown category. Partially destroyed category was used if part of the site has endured destruction, while the rest of the area need not have undergone significant changes. Almost all destruction on cairns, besides that at Humić, had already been detected in 1989, while at sites with architectural remains, more recent damages were detected in equal proportion to those already documented.

An example of retrograde analysis at the Orišac site

Retrograde analysis at the Orišac site (Fig. 1) may be used to ascertain considerable devastation and detect the time when it arose. The site is situated near the *omphalos* and it is good example of the way in which changes occur over a larger area than that defined as an archaeological site, and which are directly reflected on it. Orišac is a site at which dry stone walls were levelled and area repurposed as a disposal site for building material which is still active today. Due to this troubling situation which remains unchanged, it has been taken as a striking example of the inability to enforce cultural landscape and/or individual archaeological sites protection policies. At Orišac, where a distribution of Roman surface finds was detected over a small area of approximately 2,500 m² and an intense field survey was conducted¹⁹ changes in the planting of crops did not lead to greater changes on the built structures. The first larger change at the site occurred in the 1960s, when the main *decumanus*²⁰ was widened. At the time, the massive dry stone walls that bounded the northern side of the path were demolished. This inflicted the first considerable damage which made it impossible to find an answer to the question of the relationship between the older access way and the building, i.e., the way in which the Roman building was entered. In the 1980s, extensive destruction of the Plain was caused by the construction of an airfield and the grinding of many massive stone clearance piles. A photograph from this time makes it clear that even the massive lengthwise cairn at the site itself no longer exists.

All subsequent photographs of Orišac demonstrate how powerless the system is to prevent such

18 Gaffney *et al.* 1997, str. 41-49; vidi i Gaffney *et al.* 1993.

19 Slapšak *et al.* 2001, str. 89

20 U nedostatku grčkog termina i radi lakšeg razumijevanja na ovome mjestu koristi se rimski.

19 Slapšak *et al.* 2001, p. 89.

20 In the absence of the Greek term, the Roman one is being used for easier comprehension.



Sl. 1. Fotografije korištene za retrogradnu analizu nalazišta Orišac
Fig. 1. Photographs used for retrograde analysis of the Orišac site

puta i objekta, odnosno načina ulaza u antički objekt. Osamdesetih godina odvija se ekstenzivno uništavanje prostora Polja izgradnjom aerodromske piste i mljevenja mnogih masivnih suhozidnih gomila. Na fotografiji iz tog vremena očito je da više ne postoji ni masivna uzdužna gomila na samom nalazištu.

O nemoći sustava da spriječi devastacije govore sve fotografije Orišca. Od 1999., odnosno vremena kada je Polje već pod formalnom zaštitom, na nalazištu se počinje deponirati građevinski materijal. U sljedećim godinama prostor je dodatno niveliran, i dalje se odlažu sve veće količine građevinskog otpada, a u godinama nakon upisa na Popis svjetske baštine devastirani se prostor polako širi. Na slici iz 2015. crvenim je ucrtan položaj ogoljenog antičkog zida (vidljivog u dužini od 8 metara i visini 3 reda klesanaca) koji je inkorporiran u masivnu poprečnu gomilu. Osim što se gomila na određenim mjestima urušava preko zida, u ljeto 2015. po vrhu je zaravnjena cijelom svojom dužinom, radi olakšavanja pristupa sjevernijim parcelama koje su pripremljene za sadnju.

Konzervatorski odjel u Splitu nekoliko je puta pisao rješenja o obustavi radova i slao inspekcije. Odlaganje otpada i strojeva nije se zaustavilo, što svjedoči o nemoći sustava pri provođenju mjera zaštite prostora. Orišac, na žalost, nije jedini primjer devastiranog nalazišta na kojem se, bez obzira na izricanje zabrane, devastacije i dalje odvijaju.

Zaključak

Iako se problematika ovoga rada zasniva na utvrđivanju stanja i definiranju rizika za arheološka nalazišta Starogradskog polja, njih nije moguće izlučiti kao posebnu cjelinu neovisnu o promjenama koje se događaju na razini čitavog krajolika. Posve je očito da neke od promjena devastiraju prostor na vrlo ekstenzivnoj površini, te se odražavaju s jedne strane na stanje krajolika u cjelini, a s druge neposredno na ostatke arheološke baštine.

Cijeli otok Hvar, a time i Starogradsko polje, danas dijeli sudbinu mnogih mediteranskih zemalja čiji su krajolici vezani uz more izloženi procesu intenzivnih fizičkih transformacija. Jedna od posljedica prijelaza na novu granu privrede - turizam, koji je postao glavni izvor prihoda, neisplativost je poljodjelstva. To je dovelo do vegetacijske degradacije, odnosno zarastanja plodnog zemljišta, o čemu svjedoči oko 60 % neobrađene površine Starogradskog polja. Trend napuštanja zemljišta nemilosrdno se odražava i na arheološkoj baštini Polja. Pritom kamene gomile nisu dobar pokazatelj jer, iako se okolna zemljišta obrađuju, oko njih se u većini slučajeva ne uklanja vegetacija. S druge strane, nalazišta s ostacima arhitekture, rimske vile i grčka kula, u 20 slučajeva zarasle su

devastation. Since 1999, i.e., during the time when the Plain had already been placed under formal protection, building material began to be deposited at the site. Over the following years, the area was additionally levelled, and increasingly higher quantities of building material continued to be deposited, while in the years after inscription on the World Heritage List, the devastated area slowly began to expand. The position of an exposed Roman wall (visible to a length of 8 m and a height of 3 rows of dressed stones), which was incorporated into a massive perpendicular clearance pile, is marked in red on a photograph from 2015. Besides the fact that the pile collapsed over the wall at certain places, in the summer of 2015 its top was levelled down its entire length to ease the approach to the more northerly plots which were prepared for planting.

The Conservation Department in Split issued orders to halt these works on several occasions, and state inspectors were deployed. The disposal of waste and parking of heavy machinery did not stop, which testifies to the system's inability to enforce spatial protection measures. Orišac, unfortunately, is not the sole example of a devastated site, at which devastation continues despite the issuance of bans.

Conclusion

Even though the focus of this paper is detecting the state of preservation and defining risks to archaeological sites in the Stari Grad Plain, they cannot be separated as discrete units independent of the changes which occur in the entire landscape. It is obvious that some of the changes devastate the terrain over a very extensive surface, and they are reflected on the condition of the landscape as a whole, and directly on the archaeological heritage.

The entire island of Hvar, and thereby also Stari Grad Plain, today share the fate of many Mediterranean countries, where the landscapes tied to the sea are undergoing a process of intense physical transformation. One of the consequences of the transition to a new economic branch, tourism, which has become the primary source of revenue, has been that agriculture is no longer a feasible source of income. This has led to degradation via vegetation, meaning the overgrowth of fertile lands, which is demonstrated in the roughly 60% of the Stari Grad Plain that is not cultivated. The trend of abandoning land is mercilessly reflected in the Plain's archaeological heritage as well. The cairns are not good indicators in this regard, because even though the surrounding soil is cultivated, in most cases the vegetation around them is not removed. On the other hand, the sites with architectural remains, Roman villas and a Greek tower, are overgrown with

u vegetaciju, 2 nalazišta se koriste za odlaganje građevinskog materijala, 2 su gotovo u cijelosti srušena gradnjom, a samo su na njih 4 zemljišta u cijelosti obrađena.

Na drugoj razini prostor Starogradskog polja bespoštedno se prilagođuje današnjim potrebama. Jedan od aspekata je ekspanzija građevinskog područja, koja se ne događa samo u građevinskom dijelu okolice grada već se, bez obzira na zabrane, infiltrirala duboko u ruralno zaleđe. Nakon formalne zaštite Polja izgrađeni su objekti na području 3 arheološka nalazišta s ostacima arhitekture.

Gradnja za sobom povlači cijeli niz radnji koje se, u većini slučajeva destruktivno, odražavaju u prostoru te neposredno na fizičko stanje kulturne, a time i arheološke baštine. Za potrebe gradnje na južnom su rubu Starogradskog polja otvoreni brojni nezakoniti iskopi čistog pijeska²¹ (budući da je njegov uvoz s kopna vrlo skup) te su formirana brojna nezakonita odlagališta građevinskog materijala. Oni predstavljaju najekstremniji način devastacije prostora pod formalnom zaštitom. To je na nekim dijelovima Starogradskog polja dovelo do potpune transformacije pravilne strukture ruralnoga kulturnog krajolika, ključne značajke zbog koje je Polje uvršteno na UNESCO-ov popis svjetske kulturne baštine. Ne možemo više govoriti o minornim modifikacijama, jer nove promjene predstavljaju veliku prijetnju glavnim značajkama kulturne i povijesne fizionomije Starogradskog polja. U posljednjih nekoliko godina može se primijetiti kako se sve više nezakonitih iskopavanja pijeska odvija izvan granice obuhvata zaštite Starogradskog polja, odnosno uz samu njegovu granicu.

Provoditi retrogradnu analizu da bi se valorizirala arheološka baština, ujedno znači determinirati razloge zbog kojih određeni dijelovi nisu očuvani. Takva analiza omogućuje detekciju vrsta ugroženosti i načine njihovih širenja tijekom duljeg razdoblja, dok se dokumentiranjem trenutnog stanja krajolika utvrđuju trendovi koji se aktivno u njemu odvijaju. Retrogradnom analizom zamijećene su promjene na suhozidnim strukturama na trećini pojedinačnih arheoloških nalazišta, koje su se dogodile iz različitih razloga. Pritom je definirano da se više promjena događa na nalazištima s ostacima arhitekture (rimskim gospodarskim objektima) nego na pretpovijesnim kamenim gomilama - tumulima, koje su u većem broju rušene prije formalne zaštite Starogradskog polja, a ne i nakon nje. Većina rušenja suhozidnih ostataka dogodila se zbog neke vrste gradnje - infrastrukturne

vegetation in 20 cases, 2 sites are used to dispose of building material, 2 have almost entirely been demolished by construction, and the land has been entirely cultivated on only 4 of them.

At another level, the area of Stari Grad Plain is being relentlessly adapted to meet current needs. One of the aspects of this is the expansion of building zones, which is not only happening in the environs of the nearby town, rather - and regardless of bans - it is infiltrating deep into the rural hinterland. After the Plain was placed under formal protection, buildings were constructed on the 3 archaeological sites with architectural remains.

Construction brings with it an entire series of activities which are, in most cases, destructively reflected in the surrounding space and directly on the condition of the cultural and thereby also archaeological heritage. This construction has led to the opening of numerous illegal sand extraction sites²¹ (since its transportation from the mainland is rather expensive) and the formation of numerous illegal disposal sites for building material on the southern edge of the Stari Grad Plain. These constitute the most extensive form of devastation of the area under formal protection. On some parts of the Stari Grad Plain, this has led to the complete transformation of the regular layout of the rural landscape, the key feature which led to its inscription on the UNESCO's World Heritage List. We can no longer simply speak of minor modifications, because the new changes constitute a major threat to the main features of the cultural and historical physiognomy of the Stari Grad Plain. Looking several years back, one may notice an increasing number of sand extraction sites just outside of the boundary of Stari Grad Plain's protected area.

Conducting a retrograde analysis in order to assess the condition of the archaeological heritage would simultaneously mean defining the reasons why certain parts are not preserved. Such an analysis would enable the detection of the type of threats and how they spread over longer periods, while documentation of the current state of the landscape detects the trends which are still active. The retrograde analysis led to the observation of changes in the dry stone structures at a third of the archaeological sites, and they occurred for different reasons. It was determined that more changes occur on sites with architectural remains (Roman farm buildings) than on prehistoric stone mounds, tumuli, which were mostly demolished prior to the formal protection of the Stari Grad Plain.

21 Unutar zaštićenog prostora već je godine 2012. detektirano 51 odlagalište otpada i 16 nezakonitih vađenja zemlje. Više u Popović 2012; Popović 2014.

21 Inside the protected zone, 51 waste dumps and 16 instances of illegal soil excavation have been registered in 2012. More in Popović 2012; Popović 2014.

(trafostanica, aerodromska pista) ili privatne (gradnja kuća, nivelacija zbog korištenja zemljišta za odlaganje strojeva i građevinskog materijala). Bez obzira na formalnu zaštitu i izrečene zabrane radova, mnogi primjeri unutar zaštićene zone (koji ne moraju biti vezani za pojedino nalazište, ali ekstenzivno uništavaju fizionomiju Polja) jasno govore da za sada nemamo pravog rješenja za borbu s nezakonitim radnjama u obuhvatu zaštite Starogradskog polja.

Pojedinim ostacima antičke arhitekture koji stoje samostalno, neprekriveni suhozidnim gomilama, prijeti prirodna degradacija, odnosno urušavanje. S druge strane, velik je broj nalazišta na kojima nisu utvrđene promjene te se smatraju dobro očuvanima, iako su danas prekriveni gustom neprohodnom vegetacijom. Neinformiranost vlasnika o tome da se na njihovim posjedima nalaze arheološki lokaliteti (za što postoji zakonska obveza) jedan je od ključnih previda službe za zaštitu spomenika, koji se izravno odražava na stanje arheološke baštine. Etnološka vernakularna baština, poput kamenih kućica ili malih poljskih skloništa – *trima* i *teza*, lako se razaznaje u prostoru (zbog čega je njezina vrijednost razumljiva) te za njezino očuvanje postoji veliko zanimanje lokalne zajednice. Nema razloga sumnjati da bi isto zanimanje postojalo i za arheološku baštinu da se deseminiralo znanje o njoj. Za sada ostaje pitanje: *koliko nalazišta treba biti ugroženo da...?*

Most of the demolition of dry stone walls occurred due to some type of construction: infrastructure (electrical station, airfield) or private (construction of houses, levelling of land to park machinery or unload building material). Regardless of the formal protection and the issued bans on works, many examples inside the protected area (which need not be tied to a specific site, but extensively devastate the Plain's physiognomy) clearly indicate that we have no legal solution for the struggle against illegal works within the protected area of Stari Grad Plain.

Individual remains of stand-alone Greco-Roman architecture, which are not covered by newer clearance piles, are threatened by natural degradation, i.e., collapse. On the other hand, there is a higher number of sites at which no changes have been detected and which are considered well-preserved even though covered by dense, impassable vegetation today. The failure to notify owners that there are archaeological sites on their property (which is a legal obligation) is one of the oversights of the monument protection service, which is directly reflected in the condition of the archaeological heritage. The ethnographic vernacular heritage, such as small stone houses or small field shelters - the *teza* and *trim*, can be easily recognized (so that its value is understandable) and there is a considerable interest in its protection by the local community. There are no reasons to doubt that the same interest would exist for the archaeological heritage if knowledge about it was disseminated. For now the question remains: *how many sites must be endangered until...?*

LITERATURA / BIBLIOGRAPHY

- Bintliff 1988 J. Bintliff, *The Ager Pharensis Survey*, in: *Recent Developments in Yugoslav Archaeology*, J. Chapman, J. Bintliff, V. Gaffney, B. Slapšak (eds.), BAR International Series 431, Oxford 1988, 151-154.
- Eisenbeiss 2009 H. Eisenbeiss, *UAV Photogrammetry*, doktorska disertacija, Institut für Geodäsie und Photogrammetrie, Zürich 2009.
- Gaffney et al. 1993 V. Gaffney, B. Kirigin, M. Petrić, N. Vujnović, *Kratak pregled procesa uništenja arheoloških spomenika na otoku Hvaru i prijedlog za njihovo čuvanje i prezentaciju*, Mogućnosti 1-2, Split 1993, 215-223.
- Gaffney et al. 1997 V. Gaffney, B. Kirigin, M. Petrić, N. Vujnović, S. Čače, *Projekt Jadranski otoci, Veze, trgovina i kolonizacija 6000 pr. Kr. - 600 god., sv. 1, Arheološka baština otoka Hvara, Hrvatska*, BAR International Series 660, Oxford 1997.
- Kirigin 2004 B. Kirigin, *Faros, Parska naseobina, prilog proučavanju grčke civilizacije u Dalmaciji* Vjesnik za arheologiju i historiju dalmatinsku 96, Split 2004.
- Mlinar 1997 J. Mlinar, *Merska analiza parcelacije za rekonstrukciju postopka izmere limitirane agra grške kolonije Pharos na otoku Hvaru*, diplomski rad br. 483. Univerza v Ljubljani, Fakulteta za gradbeništvo in geodezijo, Ljubljana 1997.
- Musson et al. 2013 C. Musson, R. Palmer, S. Campana, *Flights into the Past. Aerial photography, photo interpretation and mapping for archaeology*. URL:http://archiv.ub.uni-heidelberg.de/propylaeumdok/2009/1/flights_into_the_Past_2013.pdf (25.10.2016.)
- Neitzel, Klonowski 2011 F. Neitzel, J. Klonowski, *Mobile 3D mapping with a low-cost UAV system*, International Archives of the Photogrammetry, Remote sensing and Spatial Information Sciences Vol. XXXVIII-1/C22, Zurich 2011, 1-6.
- Nex, Remondino 2014 F. Nex, F. Remondino, *UAV: platforms, regulations, data acquisition and processing*, in: *3D modelling in archaeology and cultural heritage*, F. Remondino, S. Campana (eds.), BAR International Series 2598, Oxford 2014, 73-86.
- Novakovič, Turk 1991 P. Novakovič, P. Turk, *Kamen na kamen palača... (iskopavanje gradišča na Krašu)*, Arheo 12, Ljubljana 1991, 57-68.
- Popović 2012 S. Popović, *Monitoring Starogradskog polja: Registar izgrađenih objekata, probijenih putova, odlagališta otpada i vađenja zemlje - stanje 2012.*, Izvještaj projekta
- Popović 2014 S. Popović, *Monitoring Starogradskog polja: Studija stanja arheoloških lokaliteta u zaštićenoj zoni Starogradskog polja 2014*, Izvještaj projekta
- Risbøl et al. 2015 O. Risbøl, C. Briese, M. Doneus, A. Nesbakken, *Monitoring cultural heritage by comparing DEMs derived from historical aerial photographs and airborne laser scanning*, Journal of Cultural Heritage 16, 2015, 202-209. URL:http://www.academia.edu/8027170/Monitoring_cultural_heritage_by_comparing_DEMs_derived_from_historical_aerial_photographs_and_airborne_laser_scanning (15.11.2016.).
- Sauerbier, Eisenbeiss 2010 M. Sauerbier, H. Eisenbeiss, *UAVs for the documentation of archaeological excavations*, International Archives of the Photogrammetry, Remote sensing and Spatial Information Sciences Vol. XXXVIII Part 5, Commission V Symposium, Newcastle upon Tyne, UK 2010, 526-531.
- Skupina autora/Group of authors 1993 *Mišljenja*, Mogućnosti 1-2, Split 1993, 227-233.
- Slapšak et al. 2001 B. Slapšak, M. Erič, B. Mušič, D. Plevnik, *Landscape structures survey in the chora of Pharos, GIS support, visualisation and landscape micro-analysis*, in: On the good use of geographic information systems in archaeological landscape studies, B. Slapšak (ed.), COST Action G2 - European Commission 2001, 81-93.
- Slapšak 2002 B. Slapšak, *Nova opažanja o parcelaciji chore Farosa*, in: Grčki utjecaj na istočnoj obali Jadrana, N. Cambi, S. Čače, B. Kirigin (eds.), Split 2002, 195-220.
- Verhoeven 2009 G. Verhoeven, *Providing an Archaeological Bird's-eye View - an Overall Picture of Ground-based Means to Execute Low-altitude Aerial Photography (LAAP) in Archaeology*, Archaeological Prospection 16.4, 2009, 233-249.

Sara Popović, Valorizacija arheoloških nalazišta u Starogradskom polju
Valorization of archaeological sites in the Stari Grad Plain

Verhoeven 2011

G. Verhoeven, *Taking computer vision aloft—archaeological three-dimensional reconstructions from aerial photographs with photoscan*, *Archaeological Prospection* 18, 2011, 67-73.