

## MUNICIPAL INTEGRATED COASTAL MANAGEMENT FACILITATION IN LATVIA: PILOTING PUBLIC MULTI-THEMATICAL MONITORING

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### ABSTRACT

This paper contains a pilot study on coastal values and potential means of determining and characterising them. The research case study took place in the coastal region of North East Latvia – in the municipality of Salacgrīva. The municipality coast is very diverse: coastal access, landscape and the whole biogeography is changing very much along the whole 54 km, being also rich in various natural and cultural heritage assets. Such great coastal variety in the limits of one administrative territory does require very selective governance approaches and dynamic management to be realized by local administration, which has very limited necessary capacities of all type, alike other rural coastal municipalities in Latvia. Also, there is very limited coastal information as well as assessment/interpretation capacities. All this requires mandatory development of municipal coastal monitoring and information/science-policy interface, including necessary developments of bottom-up governance approaches and, at the first, developing of the public monitoring (citizen science approach, e.g., Eco schools alike public representatives, etc.) capacities and methodologies. There has been developed an initial proposal for a new and multi-thematic coastal core area monitoring and governance tool. Coastal resources were assessed using a coastal value-based prioritisation tool, which generates knowledge of the mutual connection among various resources/assets along the shore. During the study, data was collected along the municipal coastline taking into account the elements characterising the beach and bluff landscape, as well as the distribution of invasive plant species, algae and plants washed up by the sea, and waste created by people along the coast. This data was subsequently collated, described, and combined with separate conclusions made based on beach visitors' interviews that were conducted along the entire Latvian coast as well as interviews of the Salacgrīva municipality's main stakeholder groups. Information was also obtained from the analysis of documents seeking to facilitate development of a multi-thematic coastal value prioritisation tool and to distinguish coastal management priorities that can be set as proposals to coastal governments for developing a sustainable and more integrated coastal management background.

**KEYWORDS:** *coastal resources, coastal values, coastal quality, integrated coastal management.*

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## Introduction

By its very nature and type of use, the sea coast is a social ecological system comprised of various natural and socio-economic resources. The coast provides a range of different tourism opportunities including ways of enjoying nature, relaxing or engaging in active tourism. Along the coast, tourism is interwoven with the interests of local residents, which may centre on the economy, or on the identification and protection of nature's assets. Coastal values are typically determined from the perspective of nature, as well as anthropocentrically, as a result of which understanding of coastal values tends to be fragmented and, occasionally, subjective. Coastal development is influenced by factors related to nature and cultural heritage, social and economic factors, human actions and their impact on the environment, as well as by governance factors, i.e., the set of documents of various levels, governance instruments and regulatory standards, which, when arranged at a good level, can foster coastal development.

Coastal resources are evaluated as assets in international documents, including the European Union, European Community, HELCOM and other planning documents, as well as in regulatory enactments and planning documents adopted in Latvia. It is worth mentioning that since the accession to the European Union in 2004, documents adopted by the EU have been binding on Latvia, as a result of which their regulations are incorporated within planning documents at both national and lower levels.

A naturally or successfully governed coast provides a range of different ecological services, which represent all groups of economic services including services ensuring the functioning of nature's systems and services that make direct use of resources. In case of inadequate governance, the value of the coast as a resource may be diminished, with a decline in the overall value of the coast and in the ways that society habitually uses it.



*Fig. 1.* Schematically presented map of the Salacgrīva territory along 54 km of the coastline, and its location within the whole territory of Latvia

To ensure successful coastal governance, it is necessary to introduce various instruments and to develop tools, seeking to determine the multi-functional value of coastal resources, in accordance with which the main governance priorities must be set. Municipalities require such tools so that they can balance various coastal usage interests, as well as balance the use of various coastal resources for sustainable governance planning, applying theoretical knowledge in practice. The goal of the pilot study was to recognize factors determining and influencing coastal values, and, through the development of a value prioritisation tool, to prepare eventual directions for coastal governance proposals so that to develop integrated coastal governance in Salacgriva Municipality (Figure 1).

Tasks for the initial study seeking to prepare coastal governance proposals for development of integrated coastal governance in Salacgriva Municipality were monitoring of the municipal coast and collection of the coastal data required by the study for subsequent analysis:

- Quantity and composition of algae and plants washed up by the sea.
- Invasive plant species along the coast (*Rosa rugosa*, *Hippophae rhamnoides*).
- Factors characterising the beach and bluff zone.
- Rubbish on the beach and bluff zone (beach litter).

Collection of data regarding the current situation on the coast has been conducted using the previously prepared data sheets (Urtāne, Urtāns, 2016). The next step was interpretation of the results obtained and, through the development of a coastal value prioritisation tool, determination of the multi-functional value of the coast.

Assessment of the current situation on the coast. Coastal biological values in Salacgriva Municipality are comprised of various natural components, which form good environmental conditions for development of biological diversity: coastal biotopes, specially protected nature territories, important places for birds, amount of algae washed up by the sea onto the shore, and factors influencing them, such as the presence of people, i.e., coastal population and visitation. The characterisation of the coastal landscape in Salacgriva Municipality has been formed by knowledge of the beach surface, its overgrowth with reeds, the height of bluffs, the positioning of now known 72 buildings and 16 fences that are visible from the seashore. Also, along the entire municipal coast, access to the beach is provided by 115 well-maintained descents in the form of steps and boardwalks, as well as 118 descents with no infrastructure.

Accessibility of the beach is characterised by the roads leading to the shore zone – including roads of local importance, roads of individual significance on private property, and the proximity of the A1 (Via Baltica) State Highway. It is also characterised by descents to the sea and cycling infrastructure, which orderliness has been noted on several occasions during the visits to the coast in Salacgriva Municipality. It is subject to the influence of coastal and natural beach conditions (part of the beach may be very overgrown with reeds, formation of lagoons and coastal grasslands that make it difficult to monitor not only the entire shore zone and the section of the beach itself, but also to assess buildings, descents and adjoining roads).

Importantly, the quality of the beach and its nearby areas as a leisure resource is characterised according to several criteria that diminish its attractiveness, especially when the one completing the coastal data sheets can get an impression that: quality is reduced by a large amount of algae and plants washed up by the sea, the amount of rubbish generated by humans, and the spread of invasive species along the coast.

## 1. Integrated coastal governance

A coastal zone, according to HELCOM recommendations, is defined as a 5 km inland zone with limited commercial activity. In Latvian legislation, it is stipulated that a beach is a section of dry land on the seashore, which stretches from the water line to the first natural vegetation on dry land, and, the width of the coastal area protective zone is dependent on the width of the coast, but it is not less than 300 m of dry land; in cities and villages it may start from 150 m, but coastal value is defined by the quality and possibilities to utilise various coastal resources. Four cities and 12 coastal districts are located along the Latvian coast, including Salacgriva Municipality with 54 kilometres of the coastline.

The concept of integrated coastal governance was originally based on attempts to develop a unified governance system for an all-encompassing approach to sectoral and vertical activities that influence processes along the sea coast (Lawrence, 1997). Nowadays, integrated coastal governance is considered to be the most successful instrument in the attainment of sustainable coastal development in many coast-related EU policy documents, such as the Marine Strategy Framework Directive, and sustainability itself has clearly been defined as a component of integrated coastal governance, denoting and ensuring the sustainable use and development of the coast (Garriga, Losada, 2010; Takuro et al., 2016). Typically, integrated coastal governance work with issues related to the governance of a specific territory, as well as with the resources that arise through the confluence of various sectors and activities at sea and on dry land (Aigars, 2017).

Integrated coastal governance fulfils various functions such as fostering economic growth along the coast and ensuring social welfare of the society linked to the coast (Ernststeins, 2008). The territorial planning function plans the current and future use of a territory, as well as ensures that long-term visions would be mapped out. In contrast, the resource governance function protects the ecological background of the coast and the sea, ensuring conservation of biological diversity and sustainable use of various resources. Integrated coastal governance also facilitates the resolution of various conflict situations that arise between various social groups and their interests. In the preparation of governance plans, increasing developmental progress should be reflected in relation to the link between ecosystem approaches and human activities, in order to draw attention to various urban and rural territorial utilisation problems that are characteristic of a coastal zone (Lawrence, 1997).

Within the framework of this pilot study and in relevance to the issues said above, we can continue, recognizing that a natural coastline, or one that is successfully governed, can provide a range of different ecological services, but in case of inadequate governance, the value of coastal resources may decline. This happens because a coastline is regularly influenced by human activities and changing climatic conditions, therefore, seeking for successful coastal governance, it is necessary to introduce various instruments and to devise tools that determine coastal values and governance priorities corresponding to them, thus facilitating integrated coastal governance. Under the auspices of the project, a coastal value prioritisation tool has been devised that incorporates the creation of a scale measuring the quality of biological, landscape, accessibility and recreation values, the results of which have been subsequently used to set potential governance priorities for coastal governance in Salacgriva Municipality.

**Sustainable coastal development.** In 2006, a document entitled Sustainable Development Policy and Guidelines was drawn up, which functioned as a catalyst for the use of sustainable development principles. The guidelines laid down practical recommendations for the use of various activities as an approach facilitating sustainable development. The main tasks of sustainable development are to change society's attitudes, behaviour and values that would ensure its growing involvement in political decision-making and in the proposal of improved environmental quality at all planning levels based on the bottom-up principle, starting with a local municipality. The tasks that form the basis for sustainable development are traditionally structured in accordance with specific sectors, namely: increasing and conserving natural resources, development of the man-made environment in harmony with the natural environment, protection of quality of the environment, ensuring social equality, as well as public participation and engagement (Kaulins et al., 2015).

Coastal ecosystems are significantly influenced by various natural factors such as the wind, low air moisture, a small amount of nutrients in the soil, as well as human activities, mostly leisure and tourism, afforestation of grey bluffs, forest felling and construction. Failure to balance these factors along the coast results in the non-fulfilment of sustainable development ideas in Latvia and Europe – there is a shortage of corresponding legislative acts, documents and understanding regarding the methodology that is directly aimed at implementing integrated coastal governance (Zeltina, 2008). In Latvia, sustainable development is not only hindered by flaws in legislative regulations and planning documents, but also by inadequate control and supervision of coastal territorial development and governance (Zeltina, 2008).

**Practices determining and regulating values.** One of the most popular ways of perceiving the coast is appreciation of the landscape, i.e., people tend to place the most value on coasts that, for example,

have an extensive seashore, steep bluffs, grottos or other natural conditions that give rise to the idea of using landscape as a resource.

Ecosystem services and green infrastructures are two approaches, which have been developed to introduce the integrated and sustainable use of resources in practice. Actually, they are based on the understanding regarding the complex shared traits of natural and social systems (Novotny, Ahern, Brown, 2010); planning experience and knowledge of the sustainable use of inland waters can be adapted to the resolution of the sea coast issues.

**The ecosystem service approach.** The ecosystem service approach is introduced as current practice within the Latvian territorial developmental planning by Latvia's Sustainable Development Strategy up to 2030 in which the natural capital approach is used in practice. Assessment of ecosystem services provides an opportunity to ascertain the economic value of nature as a resource, its contribution to society, to focus on choosing the commercially most sustainable and viable territorial development directions, as well as to calculate the return on the investment of funds invested in environmental protection, conservation and renewal. The objective of the project "Application of the Approach of Assessing Ecosystems and Services Rendered in the Protection and Governance of Natural Diversity" is to increase the understanding of Latvia's population about the issues related to ecosystem services, as well as to promote decision-making and sustainable territorial governance practices based on ecosystem service assessments.

At present, ecosystem services for the most part are determined and assessed according to the context in which they are used or influenced by people. It is assumed that ecosystem services take shape or acquire value in connection with various human activities, actions, investments and choices (Burkhard et al., 2012).

**The green infrastructure approach.** Green infrastructures can be defined very broadly as: a strategically planned network of natural and partly natural nature territories with other environmental elements, which are designed and governed so as to protect biological diversity and to offer as many ecosystem services as possible in sparsely populated and rural territories, as well as in built and urban territories. The main objective of such infrastructure is related to bringing people closer to the environment, thus providing some of the benefits offered by a healthy ecosystem, e.g., fresh air, water or intangible aesthetic services (EU, 2013). Not every green zone qualifies as green infrastructure – it must be incorporated within a certain green zone system, which besides must be of high quality (Gadi et al., 2017).

The green infrastructure issues are most often directly related to the built and industrial environment, and such beliefs are augmented by studies related to the perception of urban green zones (Shackleton et al., 2017). Moreover, it has been proved that urban green infrastructure can precipitate an increase in real estate prices, because the proximity of green zones or views of them in an urban environment is considered to be a great asset (Nazyddah Mat Nazir, 2015; Votsis, 2017).

**The social-ecological system approach.** When various environmental processes encounter socio-economic barriers, the traditional top-down governance approaches run into difficulties when it comes to effectively governing and conserving of ecosystems. In such situations, governments should facilitate the involvement of numerous participants (multi-actors) in decision-making, but the effectiveness of the agreement itself is dependent on the extent to which mutual ecological dependence is balanced with mutual collaboration models in the ecosystems under governance (Bodin et al., 2016).

A social ecological system is formed through the confluence of two separate systems in the form of a social system and an ecological system. Inside the social system, a mutual connection is formed between the various participants involved, while various resources mutually interact in the ecological system. However, when a connection between the participants in the social system and various resources develops, a social-ecological system, otherwise known as a network, is formed, (Bodin et al., 2016). SES (social-ecological system) is defined as a harmonised system, where biophysical and social factors regularly take effect in an enduring, elastic way, and is described on various scales, e.g., at the level of varying spatial understanding or organisations, which may be hierarchically connected. SES is a dynamic, complex system, which requires continual adaptation (Redman et al., 2004).

## 2. Data and methodology

The total length of the Latvia's sea coast is approximately 496 km, while approximately 45% of the total length of the country's coast is incorporated within some specially protected nature and/or culture territories. The territory of Salacgrīva Municipality includes a sea coastline spanning of 54 kilometres, which is over 10% of the total length of the Latvian coast and forms part of the territory of the North Vidzeme Biosphere Reserve. Two small towns – Salacgrīva and Ainaži – and numerous village territories are located along the sea coast, but the municipality has less than 9 000 inhabitants in total.

This first express assessment does not aspire to the status of the fully-fledged assessment and will be used for further development of methodology. The data collected will be further used to assess and characterise the value and quality of the resource comprised in that section of the coast incorporated within the territory of Salacgrīva Municipality; the assessment will be based on the coastal factors influencing the coast and the development of a coastal value prioritisation tool. The results of the project will be interpreted and collated, comparing them with the requirements stipulated in planning/regulatory documents, the results of prior studies and various documents, which incorporate information about certain coastal processes or the factors influencing them. Cartographic handout materials have been compiled to make the results easier to interpret.

Surveying coastal visitors and main municipal stakeholders. Coastal visitors were surveyed in connection with the problem of rubbish contaminating the sea along Latvia's coastline: answers of 154 respondents were collected to questions about the degree of coastal cleanliness and the main factors that in their opinion influence coastal values. This study was conducted in partnership with the Beach litter campaign, performed by the Fund for Environmental Education Latvia. Moreover, a separate study, yet within the BaltCoast project, was done in the area, interviewing the main municipal stakeholders (26 semi-structured deep interviews on municipal coastal governance) in Salacgrīva Municipality, including the municipal planners and administrators, local self-governance representatives, the corporate and mediator sectors (NGO's, the media, formal / non-formal education, science), as well as specialists from Regional environmental department (regionally located and subordinated to the Ministry of Environment) and also separately selected coastal inhabitants (10 persons).

Document studies and analysis. Analysis of documents was used as a means of obtaining information, conducting studies of document of varying levels, which contain important information about both the coastal planning issues as such, and the object and subject of the study – the sea coast and its values in Salacgrīva Municipality. In the context of this analysis, the documents are firstly state and municipal planning documents, such as sustainable development strategies, development programmes, territorial plans, the budget, as well as other specific documents including thematic plans, descriptions of legal proceedings, meeting minutes, decisions, etc., such as the Governance Strategy for Adaptation to Climate Changes, the only one at municipal level in Latvia. Likewise, there were analysed environmental overviews or verdicts collated during the preparation of major planning documents, which show what type of information and data regarding the coast are at the disposal of the municipality, and how they are further integrated into the decision-making.

The data collected includes multi-thematic and multi-discipline information collected parallelly while researchers were passing along the municipal coastline on the beach. Monitoring of the coastal section of the territory of Salacgrīva Municipality for data collection purposes was conducted in the late summer of 2016, i.e., in August and September. Field work, i.e., collection of data regarding sea algae and plants washed up on the seashore, the spread of invasive species, parameters characterising the beach and bluff zone and rubbish on the beach, was conducted using four different data sheets (hereinafter in the text referred to as forms) (Urtane, Urtans, 2016). Seeking to evenly monitor the whole coast, by proceeding on foot along the entire coastline, it was decided to divide the whole 54 km (according to the map) length of the coast into 10–12 km long stages, which could be covered in one day, recording the required data. These stages were covered on foot beside the sea heading from the south to the north, guided by GPS and the map, with each kilometre as a stage being divided into two 500 m long stages. To reflect the information obtained along the coast, a joint data table was created for all the coastal kilometres and the most important collating informa-

tion provided by the completed forms. It is important that that the summary reflects minimum and maximum values but does not highlight the average value of the data obtained along the coast.

Compilation of data on Form A: determination of the quantity and composition of washed up marine algae. The quantity, spread and composition of algae and aquatic plants washed up on the beach should be assessed. This assessment should be conducted not only for plants washed up in the immediate proximity of the shore line, but also in regard to the beach as a whole. On the beach, one may find older deposits of washed up algae that have formed as a result of bigger waves or due to a higher water level, but which at the time of monitoring may form a partly decaying, dying or rotten bank of algae that could form a favourable habitat for the growth of various rare coastal plants. It is also important to inspect the water in the shallow part of the sea within the zone of visibility – any individual plants or areas of algae floating therein must be recorded, because they may have been washed out to sea from the beach not long before or may be washed onto the seashore soon afterwards. It is necessary to clarify how big an area is occupied by washed out plants, as well as to record the composition of the set of plants and algae washed onto the seashore. It should be noted which, if any, of the groups of algae – green algae, brown algae or red algae – are dominant and which are encountered more rarely or not witnessed at all in the stage under survey. The presence of higher plants that have been washed out should also be recorded if any such are found in the surveyed sections.

Compilation of data on Form B: a record of invasive coastal species (the beach rose *Rosa rugosa* and common sea buckthorn *Hippophaë rhamnoides*). It is necessary to assess the coastal zone, which lies beyond the first dry land vegetation or the shore section covered with dry land plants up to the boundary of visibility approximately 50 m from the beach. The spread of invasive species is assessed according to the previously specified signs.

Compilation of data on Form C: characterisation of the beach and bluff zone – it is necessary to assess the whole coast to the boundary of visibility, walking along the seashore or beach zone. The form records information such as the beach surface, the type and number of inflowing waters, the structure of bluff overgrowth, buildings and fences visible from the beach zone, the number thereof, as well as descents into the sea and the quantity of such descents within each section. Well-maintained descents to the sea are interpreted as being any part of man-made infrastructure: steps, boardwalks and structures that serve to direct the flow of visitors to the beach along specific paths, and which reduce the impact of humans on the bluffs and the plants growing there. Elemental descents are considered to be well-trodden paths and trails over steep coastal banks or dunes and bluffs.

Compilation of data on Form D: a list of beach rubbish; it is necessary to record beach rubbish found within the beach zone. For inventory purposes, the form highlights the most common groups of rubbish contaminating the sea: glass, PET bottles, plastic, waste of animal origin, hygiene items, paper, metal objects and fishing inventory. However, as a result of beach monitoring, several more individual groups of rubbish are regularly recorded in notes, i.e., rubber, glass bottles and jars, plastic bags and polystyrene.

### 3. Analysis of the research results and discussion

The data was collected based on teamwork, dividing tasks into the completion of four study registration forms: about algae and the highest plants washed up along the seashore; on the spread and volume of invasive species such as the beach rose *Rosa rugosa* and the common sea buckthorn; on the parameters characterising the beach and bluff zones; and regarding the prevalence of rubbish littering beaches along the entire length of the municipal coast.

#### 3.1. Characterisation of coastal values

Characterisation of the coastal biological value. The set of analysed biological values along the coast is comprised of various natural components that form good environmental conditions for the development of biological diversity. Assessing biological values, there are taken into account such parameters

(coastal biotopes and their resident species, specially protected plants) that determine the coast's high overall biological value, as well as the presence of places important to birds. However, the quality of biotopes is also dependent on the degree to which human beings are present in the area; a long-term increase in human activity will result in degradation of biological values, whereas only the presence of biological values is measured in this particular group of parameters characterising the coast. In turn, the impact of human presence as shown by the structure of coastal settlement and accessibility was evaluated by conducting an assessment how natural and accessible the landscape is. Likewise, to prevent the doubling of valuation factors the presence of invasive plant species such as the beach rose (*Rosa rugosa*) and the common sea buckthorn (*Hippophaë rhamnoides*) were assessed only as a factor that diminishes the value of the coast as the leisure resource; the fact that their spreading also threatens natural coastal biotopes and the plants found there was not taken into account. Yet, in the overall assessment of the coastal biological value, it is also worth to note negative aspects such as invasive species and their spreading, as well as human presence. Human activity manifests itself along the coast in the amount of buildings in the bluff zone, condition of plants found on the beach, trampled bluffs, spontaneous collapses of sand caused by descents to the sea, along with other factors that are described more precisely in subsequent chapters.

**Characterisation of the coastal landscape.** A total of 72 buildings and 16 fences appear on the coastal landscape in Salacgrīva Municipality. The quantity of buildings and population density along the coast influence greatly the formation and number of descents to the sea – the average number of descents per coastal kilometre is 4.3 (compared to 1.3 buildings on average per coastal kilometre). However, when it comes to the type of a descent – 2.19 elemental and 2.13 well-maintained descents per coastal kilometre – the total number of well-maintained and elemental descents to the sea along the coast are similar, i.e., 118 elemental compared to 115 well-maintained descents. It is worth noting that the coastal stage from Kuiviži to Ainaži is a specific one, because an extensive beach zone has taken a shape that is overgrown with reeds, forming territories with high biological value, due to which it is not possible to access the shore from the bluffs or see buildings from the coastal bluffs, if there exist any.

Overall, the mouths of 26 natural water courses entering the sea were observed along the coast, some of which could have been created by people, albeit long ago, as a result of which visually they resemble the natural ones. In contrast, 25 man-made mouths in the form of ditches and drain pipes were observed along the Salacgrīva coast. Numerically dominant in terms of their spread across the bluffs are bushes, a fact which is attributable to the frequently observed on the open coastline, coastal bluffs and prevalence of human settlements along the coast. However, one also encounters quite a lot of deciduous tree stands and pine forests, also containing deciduous trees and shrubs.

Assessing the landscape values, the following parameters have been taken into account: evaluation of how natural the landscape is. So, the landscape was assessed according to the natural quality of it and the degree to which it has been transformed. Moreover, there has been also reported the presence of sightseeing objects or natural, cultural heritage objects along the coast, which generate understanding of the uniqueness of the coast, and can attract more holidaymakers and tourists.

**Characterisation of the beach accessibility.** Assessing the accessibility of the coast, two parameters were taken into account as resources – access to the beach from the nearest roads and cycling infrastructure coverage along the coast. These parameters indicate how much subjective value has been given to the coast in previous coastal, parish or district plans, if there are stages of the coast without access by road, a shortage of directions is obvious, or cycling infrastructure is directed further away from the coastline or bluffs. Mainly, cycling infrastructure is established along minor roads or major highways, where movement can be dangerous and unsuitable for any cyclist wishing to use opportunities provided by the coastal cycling infrastructure.

Accessibility along the entire coast is characterised by roads adjoining the coast, proximity of the *Via Baltica* highway, infrastructure of cycle paths and directions on the adjoining the highway, as well as at the edge of the sea, on the bluffs and on local roads, which sometimes extend into the protected zone of coastal bluffs. Therefore, accessibility is deemed to be poor along the last stage of the coast from Kuiviži to Ainaži, where one can reach a specific point of the coast only by walking a considerable distance along the shore.



The beach accessibility has been also stipulated in previous documents such as the North Vidzeme Biosphere Reserve tourism development plan, where access to the coast is divided into three degrees: easily accessible beaches, beaches with limited accessibility and practically inaccessible beaches. The majority of coastal beaches incorporated within the territory of Salacgrīva Municipality have been assessed as beaches with limited accessibility. Easily accessible beaches are positioned around inhabited places such as Tūja, Salacgrīva, Ainaži, as well as Vitrupi, where the *Via Baltica* highway runs close to the sea and a car park has been established along its edge.

Characterisation of the beach quality as for recreation resource use. Algae and higher plants washed up by the sea. Information was collated to understand the significance of sea leachate in characterising the coast quality, as well as its value as the resource. Washed up higher plants are seen not in many places along 55 km, and often only separate plants, mainly representing *Cladophora sp.* and less *Enteromorpha sp.*, yet *Sphacelaria rigidula*, *Fucus vesiculosus*, *Furcellaria lumbricalis* and *Coccolytus truncatus* are seen comparatively rear. However, in separate sections of the coast, one can encounter very wide zones where one can find a lot of washed up higher plants that are interwoven with small sections of reed beds. In places, overgrowth with reeds already covers an area spanning several metres out of the very narrow sandy section of the beach. However, there are also places and areas spanning over 200 m that are dominated by washed up green algae with a large mixture of brown algae, which is interspersed with approximately the same volume of red algae.

Rubbish generated by human beings. Data on rubbish generated by human beings along the Salacgrīva Municipality coast was compiled to obtain the data required to characterise the beach. It represents the quantity of units of rubbish not on the coast, but rather the quantity which people, such as holiday makers, encounter within their sight in a single section of the coast, while moving along the sea coast. The most common form of rubbish found along the coast is plastic litter. Other frequently encountered groups of rubbish include glass, polystyrene, rubber and paper. In terms of the classification of units of rubbish, the biggest proportion is comprised of various plastic fragments: in separate stages they comprise approximately 73% of all recorded units of rubbish.

The spread of invasive species along the coast. The spread of invasive plant species such as the beach rose *Rosa rugosa* and the common sea buckthorn *Hippophaë rhamnoides* within the beach zone and the shore of the Salacgrīva Municipality coast, fluctuates considerably – there are places with the beach rose covering less than 10 m<sup>2</sup>, yet also enough places of 100 m<sup>2</sup> and even of 500 m<sup>2</sup> where this plant prevails.

### 3.2. Determination of coastal mono-functional values

While assessing the coast as the leisure resource and determining its value, the authors analyse the factors that determine deterioration of the beach in terms of its quality, i.e., the spread and volume of algae and higher plants along the seashore and the beach that have been either washed up or are freely floating along the shore. There is assessed amount of rubbish generated by people on the seashore and the beach, as well as spread of invasive species that hamper the use of the beach. For example, the beach rose hampers the passage across the bluffs, whereas the branches of the common sea buckthorn have needles which can prick people when they end up in the sand and dry out. The washed-up algae have a negative impact on the quality of the coast as the leisure resource, which is confirmed by interviews conducted with coast visitors (LU GZZF, 2016).

Seeking for sustainable use coastal resources, it is necessary to balance the respective interests of using and conserving the resource. Having the aim to ascertain coastal values, there have been distinguished four groups of coastal parameters that need to be characterised:

1. Coastal biological values.
2. Coastal landscape values.
3. Coastal accessibility.
4. Value of the coast as the leisure resource.

While prioritising coastal values, several measurable parameters were applied to each of the aforementioned coastal value groups as well as a point valuation scale was devised (Pommere et al., 2017). The parameters to be assessed were identified in the course of inspection of the territory based on the results of literature analysis and the survey of beach visitors, conducted during the summer of 2016. Interviews have revealed that coastal visitors mainly notice factors such as rubbish on the beach and washed up algae, yet cases when the spread of the beach rose hinders access to the sea were also mentioned as a factor influencing the value of the leisure resource.

To determine coastal governance objectives, first it is necessary to determine the mono-functional values of the coast, which is the initial step in determining the coastal governance priorities. The coastal value is individually determined according to each parameter by pointing out mono-functional values of all the surveyed kilometres.

To identify mono-functional values, the research territory was divided up into 1 km long stages, grouping these into five groups of 10-12 km long stages.

Table 1. Coastal mono-functional values along Dunte-Tuja stage of the coast

Dunte – 10 km – Tuja										
Parameter to be valued per coastal kilometre:	1	2	3	4	5	6	7	8	9	10
1. Coastal biological values - - -										
Spread of biotopes of EU significance along the coast	1	1	1	1	1	1	1	1	1	3
Places and biotopes of importance to birds along the coast		4		3	2	2	2	2	2	2
Higher plants and algae washed up or floating in water thus forming a feeding site for birds	2	2	2	3		1	2	2		2
2. Coastal landscape values - - -										
Valuation of how natural the landscape is	1	1		3		3	3	3	4	4
Sightseeing objects (natural and cultural heritage)			3	3		2		2	2	1
3. Accessibility of the coast - - -										
Descent to the beach	3	3	3	3	3	3	2	3	3	
Access by roads			1	1	1	1	1	1	1	1
Cycling infrastructure (directions, signs, routes) coverage along the seashore	2	2	2	2	2	2	2	1	1	1
4. The coast as a leisure resource value - - -										
Spread and volume of algae and higher plants along the seashore and beach that either are washed up or floating in water beside the shore	2	2	2	3	4	5	2	2	4	2
Human generated rubbish on the seashore and beach	1	2	3	3	3	2	2	1	1	1
Prevalence of invasive plants ( <i>R. rugosa</i> and <i>H. rhamnoides</i> ) on the beach as an impediment to its status as the leisure resource	2	4	4	4	5	4	1	1	1	4

Each stage of the coast may also be considered as valuable because of its biological or landscape values, accessibility, and use as the leisure resource. It may be a subject determining its environmental status and, in light of the current practice, its development potential. For example, tourism and cycling infrastructure may be already well-developed, i.e., with installed well-maintained descents to the sea, along with coastal information stands, etc. As it is conceivable that the use of a stage of the coast for recreation may not be valued that highly in its current state, because even though it has been ascertained that there are few invasive species in this stage and amount of rubbish along this part of the coast is not too excessive, the seashore is muddy and lots of algae and aquatic plants have been washed on to the shore. Seeking to increase quality of the beach as the leisure resource, it is necessary to carry out beach management measures. However, it is also possible that a need to clean up the beach must be balanced with a need to conserve bird habitats and feeding sites.

### 3.3. Determination and prioritisation of multi-functional values

Based on the devised scale of values and the resultant valuations of mono-functional coastal resources, as the second step along in generating a developed tool to determine the multi-functional value of the coast,

it is necessary to define the main governance objectives for sustainable use of coastal resources and their maintenance in a good condition as a guarantee of integrated governance. For the protection of the sea coast, various categories of governance objectives may be set such as: a natural value maintenance zone; a quiet leisure and nature watching zone; an active leisure zone; and an economic activity zone. To specify each category in phases, it is necessary to determine criteria according to the resultant parameters of the mono-functional assessment and its quality valuations on a certain scale. Each of the established zones requires its own governance measures, whereas others are to be characterised as being of individual significance, e.g., if a particular stage contains many invasive species which are spread across vast areas, etc.

Coastal value scale. Four groups of coastal parameters to be measured have been defined: 1) Coastal biological values; 2) Coastal landscape values; 3) Coastal accessibility; 4) Value of the coast as the leisure resource, which should be assessed while ascertaining coastal values, i.e., the sustainability of their use that can be ensured only by balancing the interests of resource utilisation and conservation. Seeking to prioritise the values, several measurable parameters have been applied to each of the aforementioned coastal value groups and a 5-point valuation scale has been devised, ranging from high to very low evaluation.

The assessment of washed up algae cannot serve as a recommendation for the performance of measures, but rather as an example for the instigation of governance issues – either individually by the municipality or through promotion of public monitoring; the quantity and composition of algae must be recorded along the entire length of the coast several times during each season, initially in the course of at least one year.

#### 4. Conclusions and recommendations for further research and development

The Salacgriva Municipality coast is very diverse, compared to the mostly traditional sandy beaches and coasts of the easy access type lying along the Baltic sea in Latvia. Coastal access, landscape and the whole biogeography is changing very much along those 54 km, being also rich in various natural and cultural heritage assets, which are interwoven with considerable biological diversity along the sea shore. Such great coastal variety in the limits of one administrative territory does require very selective governance approaches and dynamic management to be realized by local administration. The latter's capacities to have necessary coastal management qualities are very limited as, in Latvia, rural coastal municipalities cover almost the whole national coastline with: small and limited administration, long and very attractive coast, small and sparse population (less than 9000 inhabitants, including rural towns of Salacgriva and Ainazi) with very limited infrastructure, etc. In addition, there are also very limited and unregularly coastal information availability and assessment/interpretation capacities. Thus, there is an obvious need for the mandatory development of municipal coastal monitoring and information (multi-science)-policy interface, with further definitely necessary developments of bottom-up governance approaches, including public monitoring (citizen science) capacities and methodologies.

In the study, there has been developed an initial prioritisation tool based on the knowledge acquired during beach area monitoring exercise along the whole length of 54 km coastline in one rural municipality in Latvia; the monitoring has been conducted walking on foot along all accessible territories of the shore. There has been developed an initial proposal for a new and multi-thematic coastal core area monitoring and governance tool. Coastal resources were assessed using the coastal value-based prioritisation tool, which generates knowledge of the mutual connection among various resources/assets along the shore, impact of people on them, as well as the coastal governance measures to be applied on them. Obviously, besides anthropogenic load, there are also natural processes in the sea as well as on the coast which can have both type of the effects such as improving or diminishing the quality of the coast. It is especially observed when approaching the issue from the coastal planning and management point of view, including cases of increased biological quality by reducing that one of recreation, etc.

The data about the elements characterising the coast and dune areas, invasive plant species, washed out algae and man-made waste prevalence on the coast has been collected, described and further amplified by the knowledge obtained from interviews and necessary document analysis. The interviews have been done along

the whole coast of Latvia (in partnership with the Beach litter campaign, performed by the Fund for Environmental Education Latvia). There have been proposed a matrix (Urtāne, Urtāns, 2016) for the coastal shore initial assessment, comprised of determination of coastal mono-functional and multi-functional valuations, as a result of which four basic categories of governance objectives have been obtained. Based on further future assessments, there could be provided specific proposals for coastal sustainable resource governance and coastal governance. The coastal value prioritisation scale has been devised in two steps: firstly, assessment of the current situation has been performed, then assessing the state of coast resources which it subsequently formats, generating colouring that leads to the prioritisation of individual coastal governance objectives. The specified main governance objective categories that lead to zonal proposals for the municipality are as follows: natural value maintenance zones; recreation zone consisting of (1) a quiet rest and nature observation zone and (2) an active leisure zone; and an economic activity zone (Urtāne, Urtāns, 2016).

In the future development of the project, such observations would require a more detailed programme, which would incorporate coastal durability and erosion aspects, shallow sections of the sea water and the water basin, as well as assessment of the coastal zone on a greater scale. Also, a more detailed review of all descents must be conducted to ascertain through which property or plots of land they reach the shore, i.e., what type of access they provide, and how many people can use this, thus clarifying the intensity and volume of such use.

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## INTEGRUOTAS PAKRANČIŪ VALDYMO TAIKYMAS LATVIJOJE: ŽVALGOMOJI DAUGIAKRITERĒ STEBĒSENA SAVIVALDYBĒJE

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### Santrauka

Šiame straipsnyje pateikiamas žvalgomasis pakrančių vertės tyrimas ir galimos pakrantės vertės nustatymo bei apibūdinimo priemonės. Atvejo studijos analizė atlikta Šiaurės Rytų Latvijos pakrantės regione – Salacgrīvos savivaldybėje. Savivaldybės pakrantė labai įvairi: prieiga prie pakrantės, kraštovaizdis ir visa biogeografija keičiasi palei visą 54 km pakrantę, be to, ši pakrantė pasižymi gamtos ir kultūros paveldo įvairove. Tokia didelė įvairovė, esanti vienos administracinės teritorijos ribose, verčia taikyti skirtingus valdymo metodus, greitai reaguoti, kilus nenumatytų problemų. Tai turi įgyvendinti vietos administracija, kas yra sudėtinga, esant ribotiems pajėgumams (finansiniam ir žmonių ištekliui). Ši teritorija priklauso kaimiškajai pakrančių savivaldybei Latvijoje. Informacija apie šios pakrantės išteklius ribota, juo labiau apie vertinimo metodikas ir interpretacijas, kaip valdyti pakrantes. Tam reikia nuolat stebėti, kaupti ir vertinti viešųjų pa-

krančių informaciją bei reaguoti į pokyčius (gamtinius ar invazinius, sukeltus žmonių). Siekiant užtikrinti tinkamą šios teritorijos priežiūrą, būtinas ir mokslininkų, ir politikų bendradarbiavimas, įskaitant būtinus „iš apačios į viršų“ metodo pokyčius, pradedant nuo stebėsenos (piliečių įtraukimo metodai, pvz., ekologijos mokyklos, ar piliečių atstovavimo tarybose, tyrimuose ir pan.), šviečiant piliečius aplinkosaugos klausimais ir taikant naujausias vertinimo metodikas. Straipsnio autoriai parengė pasiūlymus dėl naujos daugialypės pakrančių pagrindinės zonos stebėjimo ir valdymo. Pakrančių išteklių įvertinti taikant pakrančių vertėmis pagrįstų prioritetų nustatymo priemonę, sukurtas metodas (informaciją) apie įvairių išteklių / turto sąveiką pakrantėje.

Atlikus tyrimą surinkti duomenys apie savivaldybės pakrantę, kurioje driekiasi paplūdimys ir specifinis kraštovaizdis, be to, įvertintas invazinių augalų rūšių, jūros dumblių ir augalų, išplautų jūros, bei atliekų, kurias žmonės palieka pakrantėje, pasiskirstymas. Šie duomenys apibendrinti ir apibūdinti kartu su paplūdimio lankytojų interviu, pateiktos išvados, atliktos įvertinus ir Salacgrivos savivaldybės pagrindinių suinteresuotųjų šalių grupių interviu, taip pat informacija, gauta analizuojant dokumentus. Pateikta straipsnio autorių rekomenduojama metodika padeda nustatyti pakrančių valdymo prioritetus, kurie padės jūros pakrantes turinčioms savivaldybėms kurti tvarų ir labiau integruotą pakrančių valdymą.

**PAGRINDINIAI ŽODŽIAI:** *pakrančių išteklių, pakrančių vertės, pakrančių kokybė, integruotas pakrančių valdymas.*

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