Volume 16 Issue 33
Originally issued as B5



Global Journal of human-social science: B
Geography, Geo-Sciences, Environmental Science & Disaster Management
Volume 16 Issue 5 Version 1.0 Year 2016
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-460X & Print ISSN: 0975-587X

Coastal Zone of the Sochi Re-Gion of Russia – Problems and Perspectives

By Yuriy I. Dreizis
Sochi State University

Abstract- The modern state of the Sochi region of Russian Black seacoast is parsed in the article from the point of view of beaches stability, efficiency executed of the coastal protective measures, and quality of seawater in the coastal zone. The possible influencing on an environment of engineering measures, foreseen General schema of the coastal and landslide measures on coastal zone of Greater Sochi of 1990 is considered. The offers on organization of complex monitoring of the coastal zone are made.

Keywords: coast zone, integrated coastal zone management, beaches, general schema of coastal protection.

GJHSS-B Classification: FOR Code: 969999p



Strictly as per the compliance and regulations of:



© 2016. Yuriy I. Dreizis. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Coastal Zone of the Sochi Region of Russia – Problems and Perspectives

Yuriy I. Dreizis

Abstract The modern state of the Sochi region of Russian Black seacoast is parsed in the article from the point of view of beaches stability, efficiency executed of the coastal protective measures, and quality of seawater in the coastal zone. The possible influencing on an environment of engineering measures, foreseen General schema of the coastal and landslide measures on coastal zone of Greater Sochi of 1990 is considered. The offers on organization of complex monitoring of the coastal zone are made.

Keywords: coast zone, integrated coastal zone management, beaches, general schema of coastal protection

I. Introduction

Due to the natural resources, the coastal zones all over the world always were and remain most intensively maintained sites. Half of population of the states having an exit to the sea lives at the coastal zones. The migration on coastal region from continental districts is prolonged. In outcome, there is an acute contravention between necessity in immediate consumption of natural resources of the coastal zones and necessity of maintenance of these resources safety on a long-lived outlook. In many inshore sites, including on the Black Sea coast of Caucasus, this contravention already has reached an extreme stage. The considerable proportion of the coastal zone is contaminated; its attractiveness for international tourism is reduced. The fish stocks exhaust. The problem on development of oil and gas fields on shelf, construction of cargo ports and oil terminals is permanently lifted. For stable progressing of the coastal zone, protection and recovering of an environment the acceptance of urgent effectual measures is necessary.

This problem in international scale is decided based on development and realization of the dodge of Integrated Management of the Coastal Zones (ICZM).

Per the last years, the concern to ICZM has acquired global nature. The realizations of principles and programs on ICZM participate in development both more than 50 countries of a world. In Russia the National report on ICZM, invoked also is prepared to pay attention the President, Government, Legislative power and authorities on places to problems of the coastal zones. Besides major significance for the coastal zones, there is an estimation of environmental impact (EEI) projects of different engineering activity.

All engineering measures on seashores of Russia (earlier USSR) are carried out within the framework of the so-called General Schema of seashores progressing. For coast zone of the Sochi region in the beginning 1990 years the last version of such General Schema of progressing is developed ([1-4], 1992-1995. The present article is prepared by the writers in addition to the indicated General Schema based on analysis of the existing state of coast.

Author: e-mail: yurid2006@yandex.ru

II. Materials and Methods

It was used materials published in the works of modern Russian and foreign research scientists in the management of coastal regions. Information was collected in scientific publications, as well as in open Internet resources. Analyzed reporting metrics provided in the published literature.

This article was used scientific methods, such as the principle of comparison, analysis and synthesis of the results. The article is also based on the principles of objectivity and systematic. This article was used scientific methods, such as the principle of comparison, analysis and synthesis of the results. The article is also based on the principles of objectivity and systematic.

III. State of the Coastal Zone of Greater Sochi

a) General information

The city of Sochi - representative large in-shore administrative center on the Black Sea coast, which is capturing territory 3,5 thousand km2, on which one lives about 400 thousand the person. The common expansion of a land border of the Sochi resort site constitutes more than 133 km with maximum expelling from beaches of the sea on 56 km, sea border - 105 km. The Sochi site is a health resort of Federal significance. There is a developed SPA-hotel infrastructure, plenty of SPA-hotels, boarding houses, of rest houses and etc. in city. Here is disposed about a quarter of all resort establishments of country for the adult population. Annually more than 1,5 millions tourists direct in this coastal region in summer. More than 900 thousand person simultaneously lived on the territory of a health resort Sochi per separate months of a resort season. At the same time, lump sum holding capacity of existing beaches on a site of the Black Sea coast from Tuapse to Psou is no more than 350 thousand the person (Yu.I. Dreizis, 2005; Goryachkin Yu.N., Kosyan R.D., Krylenko V.V., Nguyen Man Hang, Medvedovsky V.V., 2014).

© 2016 Global Journals Inc. (US)

Four administrative districts select in city. Historically economy of city developed around of seaport disposed in Central district; therefore, there are disproportions in progressing districts. The central district is also center of a SPA-hotels complex and industry is represented in the Fig. 1 (Dreizis, 2005, 2016). Current state of the main Primorskaya Embankment of Sochi is represented in the Fig. 2. (Serebryakov G.B., Grishin N.A., 2012).

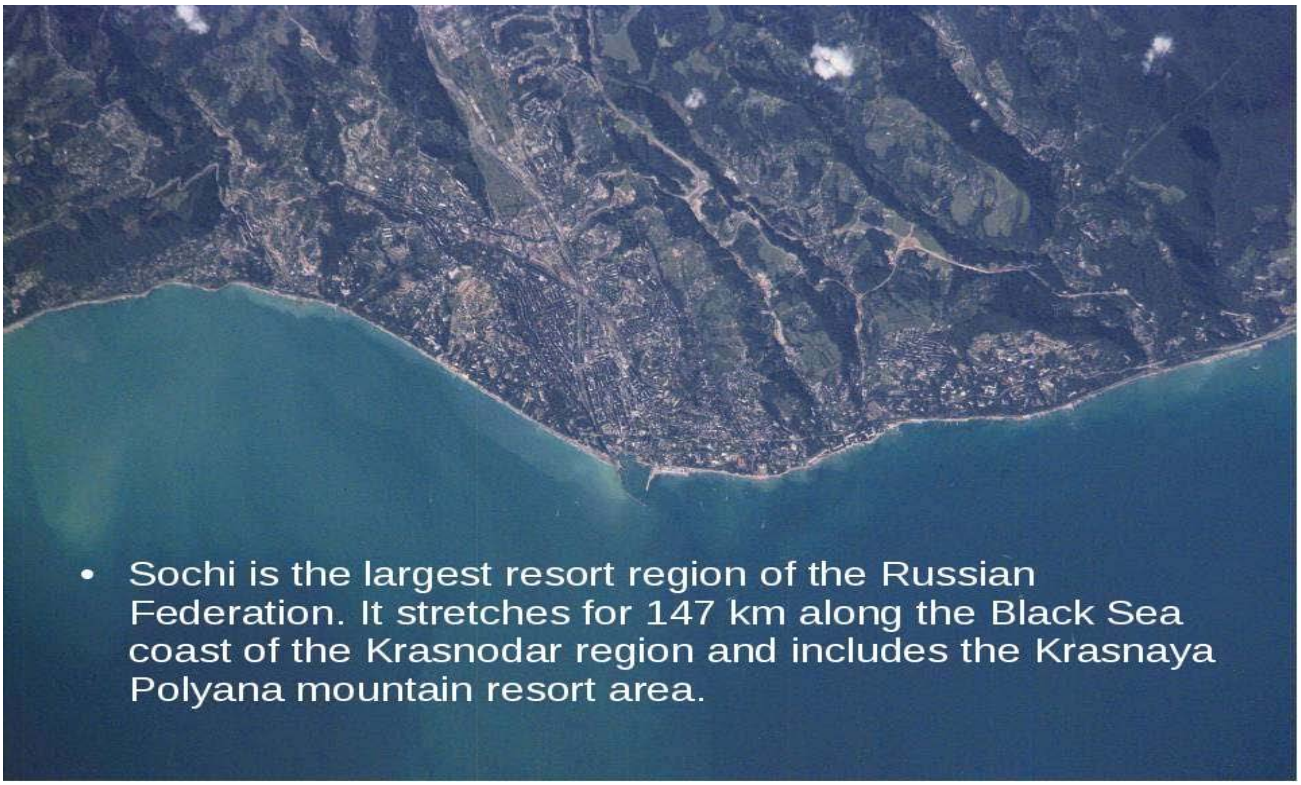

Fig. 1: Schema of Sochi region coast



Fig. 2: Current state of the main Primorskaya Embankment of Sochi

The hydrological conditions of the Black sea for coast of Russia are those, that the impurities hitting in the coastal zone, are not distributed in a central part of the sea. They concentrate alongshore. This is promoted by that circumstance that the fulcrum of the basic Black Sea current is apart about 4 nautical miles from

© 2016 Global Journals Inc. (US)

beaches, and the drift currents are directional alongshore, irrespective of a wind direction. Hitting in seawater at emergency downthrows the unrefined drains fast are distributed alongshore and in the direction of it owing to effect of nodular carrying. The absence of dodges of impurities carrying by currents can result in to formation of hold-up spots with a high pollutant concentration. The small intensity of water exchange in half-closed coastal dock spaces with the sea, plenty of impurities acting at a coastal zone, makes an inshore dock space by area of a high ecological load.

One of the basic recreational factors in Sochi region is a recreational and medical beach. Besides near to beaches is disposed and designed many objects of a cultural and sporting infrastructure: theatres, stadiums, yacht-centers, aqua parks etc.

Natural environments of the Sochi region are characterized by an average and low mountain contours, by lithologic complexes of cretaceous and paleogene, concerning high damp and daily average temperatures, which are stipulating the subtropical nature of vegetation. The seismicity of Sochi district is evaluated in 9 balls.

It is necessary to point out, that the features and originality of a geological feature of Sochi region (tectonic dissociation, progressing modern downing of beaches, high seismicity, lithologic heterogeneity) promote fissile progressing of sliding processes, destroying of beaches and native born beaches, water logging of the rivers ostium.

One of the basic transport mainlines on coast of Black sea coast is the North-Caucasian railway. In the Sochi region on a major extent (about 90 km) it is compelled drives near to the seacoast. Though there are projects of carrying of the railway deep into coasts, they are very problematic, since are interlinked to construction of tunnels, bridges and flyovers on a major extent (Fig. 3, Fig. 4).



Fig. 3 : The railway and highway driving alongshore with groin system for beaches protection



Fig. 4: The railway drives near to the seacoast

b) State of beaches in the Sochi region

The modern progressing of a coastal zone of the Sochi resort region has transgressed directivity that is stipulated by general upheaval of a sea level. It takes place within last century to an average speed 1,5-2,0 mm/years.

The beach should be considered as complex natural recreational resource, where his geologic-geo-morphological basis is indissolubly interlinked to a hydrological mode of the sea.

The beach promotes as progressing of alive organisms in the sea, and represents one of the basic recreational resources involving tourists in marine resort site.

The state of beaches (physical and ecological) defines the amount of visits in a health resort.

The common necessity in recreational beaches for all districts of the Russian Black Sea coast constitutes 410 ha. The Russian sanitary-hygienic norms define the following performances of a beach – 0,2 m lengths of shoreline of a beach at its width 25 m on 1 person. It ensures, in the long term till 2020 year, lump sum holding capacity of 820 thousand resting. Thus the common expansion of beaches should constitute about 160 km. Now total expansion of recreational beaches within the limits of the Black sea districts of Russia does not exceed 130 km, and their total floor space is about 354 ha.

This floor space powers up a back part of beaches, which one will defend from a water boundary of the sea more than on 25 m, foreseen sanitary-hygienic norms, and closed part, disposed on foreseen spacing interval till both parties from finding here engineering objects (tunnels, marine berths, buffer beaches, building polygons etc.). If to exclude from the common floor space of a beaches it is back and closed parts, the recreational floor space of existing beaches will make all about 259 ha.

The morphometrical performances of beaches in the Sochi resort region are listed in table 1 (Yu.I. Dreizis, 2005, 2016).

© 2016 Global Journals Inc. (US)

Table 1: The morphometrical characteristic of beaches in the Sochi region

Sites of beach	Expansion, km	Average width, m	Expansion of the beach with average width, m			
			5	5-15	15-25	25
River Tuapse – river Ashe	19,1	15,5	6,8	6,5	5,0	0,8
River Ashe – river Psezuapse	10,5	17,0	2,9	1,3	1,4	5,0
River Psezuapse – river Shahe	16,6	20,0	0,6	4,9	5,5	5,6
River Shahe – cape Uch-Dere	18,1	5	0,7	1,0	3,3	13,1
Cape Uch-Dere – river Mzymta	41,0	19,0	2,9	9,4	24,1	4,6
River Mzymta – river Psou	8,2	49,0	No	No	No	8,2
Total	113,5	20,9	13,9	23,1	39,2	37,3

As demonstrate introduced data's in the table 1, the expansion of offshore coastal strip in the Sochi region constitutes 113,5 km. About 40 km it is subject to landslide phenomena and up to 20 km is subject of the downfall phenomena (Fig. 5-7).

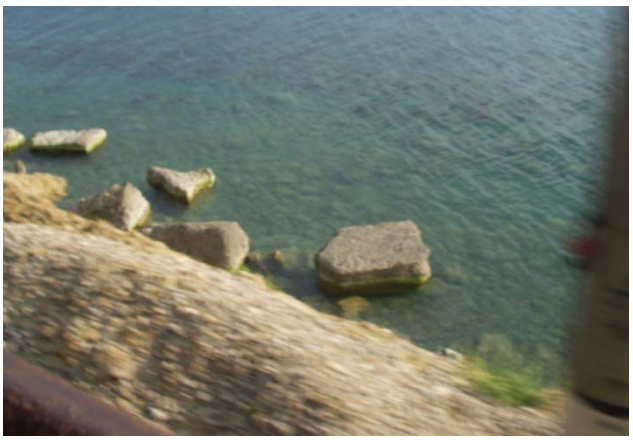

Fig. 5: The coastal site with landslide phenomena

In favorable conditions, there are beaches on overall length on miscellaneous sites of 40 km, where their width constitutes more than 25 m. On remaining 73 km width of a beach is less than 25 m and does not ensure clearing storm waves. It calls destroying beaches and strains of engineering structures finding in a zone of shock effect of sea waves. Photo of a typical sites of the Sochi region coastal zone are present in Fig. 8–28 (Yu.I. Dreizis, 2005; Serebryakov G.B., Grishin N.A., 2012; Goryachkin Yu.N., Kosyan R.D., Krylenko V.V., Nguyen Man Hang, Medvedovsky V.V., 2014).

Let's mark some features of distribution of beaches on the coast. The maximum sizes there is a beach for station Loo, where during 4 km its width constitutes 40-50 m (Fig. 8).

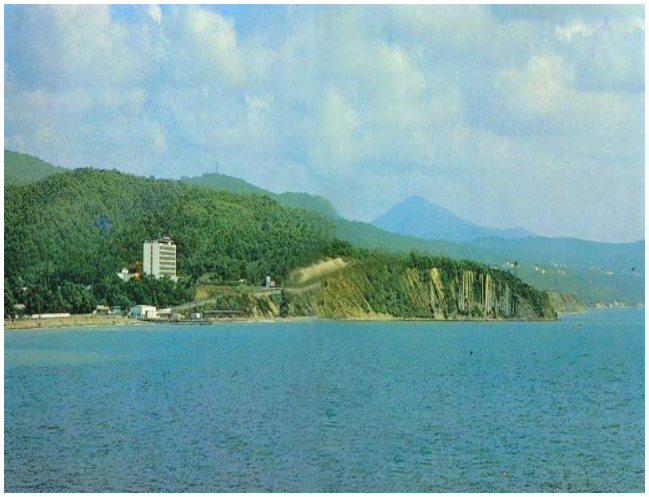

Fig. 6: The coastal site with a landslide and downfall phenomena



Fig. 7: The coastal site with a road, going along shoreline and a landslide and downfall phenomena

© 2016 Global Journals Inc. (US)



Fig. 8: Site of a coast with a free beach

From cape Uch-Dere up to an ostium of the river Dagomys the size of a beach band are constituted by 10-30 m. Further, on the south up to an ostium of the river Mamayka the beach practically misses. From the river Mamayka and up to an ostium of the river Mzymta width of beaches constitutes 10-30 m and only on separate short sites it constitutes less than 1 m. In district between of the rivers Mzymta and Psou the sizes of a beach band lay within the limits from 25 up to 60 m. It is interlinked to a deficit of a solid drain of the rivers. Per the last years, the intensive withdrawal of rubble from a channel practically of all rivers of locale is supervised.

The analysis of dynamics of a beach's width has shown that average width of a beach in 1914 year was peer 34 m to the south of town Tuapse. Till 1976 on this site the diffusion of a beach band (average width 6,1 м) was supervised. Now for the account addition on a beach average width of a beach constitutes 15,5 m, and disregarding zones of dumps average width of a beach on this site remains at a level 1964 year (about 12 м). Dynamics of beach has distinctive features on separate short sections of beach, especially in zones of beach protective structures and dumps of mined rock. Therefore, with 1956 on 1976 years on 2-3 km of a railway line of Tuapse to Adler was supplemented 116 thousand m3 of rubble that has allowed saving average width of a beach within the limits of 10-14 m.

The beach width was reduced on the average from 3 up to 17 m between of the rivers Ashe and Psezuapse for the last 70 years. The broad shingle beaches without variations were saved only to a north from an ostium of the river Ashe during 1 km and to the north of an ostium of the river Psezuapse. Also, they begun to expos to fluid wash per the last years have. Beaches are blurred completely on a considerable extent of beach for last 20 years.

The abatement of average width of a beach on a site the river Psezuapse - the river Shahe began with 1950 year and is prolonged till the present time. The beach became already on 12 m for this period. However, variations of a beach were irregular because of realization of beach protective measures: constructions of the beach protective structures and the addition of mined rock.

Average width of a beach from an ostium of the river Shahe up to cape Uch-Dere till 1955 was changed unsignificantly. The tendency of its reduction was scheduled per consequent years. It was diminished with 37 up to 29 m to 1985 year. The abatement was scored practically on all extent of this site, but with different intensity. Beaches from an ostium of the river Loo up to cape Uch-Dere there are stable and practically not changed for this time.

A beach band from Cape Uch-Dere up to an ostium of the river Mzymta underwent the greatest variations. Average width of a beach on a site was diminished with 30 m per 1914 year up to 19 m per 1955 year. The most intensive fluid wash was supervised in 1945-1963 years. Since 1964 year, due to intensive of a beach addition material, the further fluid wash managed to be stopped, and in consequent and synthetically to retrieve a beach. All sites are entirely built by beach protective structures. The least variations were undergone with a beach between the rivers Mamayka - Sochi. Here after construction of the Sochi port in 1936-1939 years the increase of a beach band till 1950 was scored at the expense of detention of an alongshore current of rubble. The size of beaches were stabilized in the next year. Per the last two decades its fluid wash, however while rather gentle was scheduled. Now practically on all extent of coastal zone from the Sochi port and up to an ostium of the river Mzymta beaches are saved under cover of beach protective structures.

The sizes of a beach band between ostium of the rivers Mzymta and Psou for the last decades were not changed almost. It is interlinked that the beach here is in state of nature. The shore on a site from an ostium of the river Mzymta up to cape Konstantinovskiy has receded on the average on 10-15 m for a period 1959-1979 years.

Even after accomplishment of measures on recovering natural beaches for the purposes of the wave breaking, their recreational floor space will be augmented all on 65 ha and will constitute about 63% from the indispensable floor space. For today, the total deficit of beaches approximately constitutes on an expansion - 31 km; on the floor space - 87 ha. The deficit of beaches in borders of Sochi region constitutes 8,8 km on an expansion and 31 ha on the recreational floor space.

Reduced above data on state of the art of offshore coastal strip testify that the existing beaches do not safeguard beach from shattering effect of surges on a considerable extent. The surplus of recreational beaches is tracked only on rather small sites of considered coast of a health resort within the limits of Sochi region.

© 2016 Global Journals Inc. (US)

The rough necessities of the recreational floor space of beaches on the Sochi site for the term of till 2014 are indicated below: on an expansion: recreational beaches - 88 km, closed - 12 km, sum - 100 km, expansion of beaches indispensable for recreation - 96 km, deficit of beaches - 8,8 km; on the recreational floor space of beaches: the existing floor space of a beach - 224 ha, floor space of a beach indispensable on wave breaking - 320 ha, floor space of a beach, indispensable for recreation, 250 ha, magnitude of a beach deficit - 31 ha (Yu.I. Dreizis, 2005).

Therefore, basic engineering decision of this problem is the creation or magnification of existing beaches up to the sizes providing complete wave cclearing at passing of the whole gales.

In the created situation, taking into account justified and all increasing draft of the tourists to the Black Sea coast, necessity:

1) keeping of the acting sanitary-hygienic norms of their accommodation,
2) preservation of unique coastal landscapes the demanded recreational progressing of the Sochi site can be provided only at native born variation of adding up practice of resort development of territories. It is necessary to create along a coast band shareware in width not less than 100 m (apart from beaches).

This band everywhere should be used for green plantings, quays, parkways and squares, automobile and foot entrances and approaches to this band. To it should flank all coastal protective and hydraulic engineering structures located in an inshore dock space of the sea.

In each concrete case of recreational usage of a maritime belt of the sea it is necessary to take into account a depth of water, geology of bottom, parameters of rocks, composing it, alongshore and cross-cut removal of beach detrital deposits existing or anticipated transshipment of a beach band by the tourists over the established specifications etc.

It is necessary to consider the extension and creation of beaches within the limits of the Caucasian coast of the Black sea, construction of hydraulic engineering recreational complexes as the basic nature protection measures. The possibility of fluid wash of beaches is eliminated with their help (Yu.I. Dreizis, 2005, 2015, 2016; Serebryakov G.B., Grishin N.A., 2012; A.Yu. Lein, I.I. Rusanov, G.A. Pavlova, A. Meluzov, Z.I. Verkhovskaya, L.R. Merklin, M.V. Ivanov, 2009; T.B. Filatova, 2009; Goryachkin Yu.N., Kosyan R.D., Krylenko V.V., Nguyen Man Hang, Medvedovsky V.V., 2014; Kanonnikova E.O., 2014).

c) Impurities of the Sochi resort region

The hydrological conditions of the Black sea for coast of Russia are those, that the impurities hitting in the coastal zone, are not distributed in a central part of the sea. They concentrate alongshore. The absence of dodges of impurities carrying by currents can result in to formation of hold-up spots with a high pollutant concentration. The small intensity of water exchange in half-closed coastal dock spaces with the sea, plenty of impurities acting at a coastal zone, makes an inshore dock space by area of a high ecological load.

The unfavorable ecological situation is supervised, basically, in narrow 3 km band from the seacoast.

Outbursts annually constitute truck - 52600 ton/years (dust -2200 ton, monoxide of carbon - 39200 ton, nitric oxides - 2100 ton, hydrocarbons - 8100 ton). The amount of ambulances was augmented from 23015 units in 1980 up to 130000 units in 2002. An amount of units of the transport on trunk mains of city - 2400-3000 automobiles/hour. The residential quarters flank to the basic mainlines.

Transport impurities give 75% from all impurities in locale.

Stationary sources - 10000 ton (sulphurous anhydride - 2200 ton, monoxide of Carboneum - 2700 ton, hydrocarbons - 600 ton). In 1993 volume consisted 7800 ton and in 1986 - 5500 ton. There are 31 enterprises in Sochi (food-processing industry - 13, domestic and mild industry - 4, build construction - 7 major concerns and tens smallsized, wood facilities -1, other - 6). The fuel and energy complex constitutes more 300 boiler, from them 60% work on Donetsk coal (high sulphurous - 3-4%), 27% on boiler oil, only 5% on gas. 8 industrial enterprises are disposed along the river of Sochi (transport enterprises, base building construction), resetting insufficiently furbished drains in the river and sea.

Agriculture - 30500 ton - nitrite nitrogen, 1460 ton - nitric nitrogen, 60 ton - ammonium azotes, 19,7 ton - copper, 75,8 ton - zinc, 100 ton - pesticides. The common floor space of grounds taken by the agricultural enterprises constitutes 31700 ha (8,9% from territory of Sochi region). Land there are basically in the coastal zone of city, not further 3-5 km from beaches in a north up to 15 km in the south of cities.

SPA-hotel complex. There are more 250 recreational establishments in Sochi region, more 120 year-round, remaining seasonal. Only 4% have own refining structures. 60% have own boiler-houses, 50% of boiler-houses is disposed near to recreational zones. The security resting by beaches constitutes - for 55% of the recreational enterprises a load on a beach less than 5 m2/person, for 45% more than 5 m2/person (request of World tourist organization - 5-25 m2/person).

Load on urban beaches are consist 1 m2/person.

Water resources. There are more than 30 rivers of length from 4 up to 90 km in Sochi region. The average modulus of a drain consist 60-70 l/sec with 1 km2. The level of contamination of the sea coastal zone

© 2016 Global Journals Inc. (US)

is interlinked to a level of contamination of the rivers and grounds of site. In Sochi is present 7 «so-called deep water water issue (depth 8-34 м), which one are in district of water use. This spacing interval constitutes less than 2 miles from beaches. The impurities concentrate near to beaches and are distributed alongshore and to it, do not leave on depth. The high bacterial impurity is permanently scored. The coastal waters in district of Sochi and river frequently do not correspond to international and Russian norms (Yu.I. Dreizis, 2005, 2015, 2016; A.Yu. Lein, I.I. Rusanov, G.A. Pavlova, A. Meluzov, Z.I. Verkhovskaya, L.R. Merklin, M.V. Ivanov, 2009; T.B. Filatova, 2009; Goryachkin Yu.N., Kosyan R.D., Krylenko V.V., Nguyen Man Hang, Medvedovsky V.V., 2014).

The data for the basic types of pollution are given in the table 2.

Table 2: The list of pollutants acting at an atmosphere, in water and in grounds on the average for one year on the Sochi resort region

Name	Data's 2008 year (ton/year)
Benzol	2,071
Benzopiren	The outbursts are minor
Diesel soot flakes - from boiler-house and truck 0,5 %	36,472
Formaldehyde	6,669
Stiren	0,004

d) Impurity of the Sochi region coastal zone

The basic polluters of waters of the given dock space are the household drains and sea trans-port.

The level of contaminations of petroleum hydrocarbons in district of ports of Tuapse and Sochi are close among themselves. The average long-term concentrations constitute accordingly 15 x -2 and 11 x -2 mg/l. The absolute maxims of concentrations, disregarding of emergency downthrows, on these districts reach 13,0 mg/l and 2,45 mg/l accordingly. For a period of supervising the average annual concentrations of petroleum hydrocarbons in district of Tuapse were changed in surface layer from 0,05 up to 0,31 mg/l, for bottom - from 0,05 up to 0,26 mg/l. The average annual concentrations of petroleum hydrocarbons in district of Sochi are changed from 0,05 up to 0,24 mg/l to a surface and from 0,05 up to 0,13 mg/l for bottom.

Interannual dynamics of petroleum hydro-carbons concentrations in both districts is characte-rized not monotonic. The average fluidized on volume concentration, both in district of Tuapse, and in district of Sochi, reaches 2,8 mc (marginal concentrations).

The seasonal variability of concentrations is expressed is gentle. The maximum concentrations of petroleum hydrocarbons were supervised in October - November, minimum - in May and August. In the course of the year, first of all, is infringed by appearance of high concentrations in July in both districts, both on a surface, and for bottom.

The time-space distribution of petroleum hydrocarbons concentrations in district of studies is characterized by variable nature.

The systematic and detailed supervising mirrors a substantial oil painting of impurity of a dock space of Sochi coastal region. The average long-term concentration of petroleum hydrocarbons constitutes in district of Sochi 0,14 and 0,09 mg/l accordingly for surface and for bottom of horizons.

The waters of Sochi coastal district during studies had also composite hydrochemical conditions. For consequent years of supervising of essential quantitative variations and demurs was not supervised. Two yardsticks should conduct the estimation of ecological state of marine resort locale: ecological - implying state of common impurity of different objects, and applied problem - performances of their suitability for a concrete kind of usage.

From the point of view of relevance of recr-eational resources for economy of marine resort, locale basic usage of a coastal zone of the sea is a beach.

For an estimation of quality of these resources, first of all from the point of view of ecological purity, the relevant parameter is water exchange in a coastal zone of the sea. For its estimation, it is necessary to know speeds of alongshore currents permitting to evaluate distribution of impurities in a coastal zone.

The ecological status of the Caucasus coast of the Russia can be estimated generally as quite satisfactory. It is essential for reasonable ecologically and economically further development in these coast of resort activities and tourism.

Significant increase in content of biogenous substances in a coastal zone is observed usually in places of a confluence of the rivers, at the cities and in areas of ports. The main critical zones of environmental risk in the Black Sea are formed in places of influence of a river drain.

To increase of recreational load of beaches and the coast there is an increase in content of biogenous substances in waters of sea coastal zones, cases of the adverse mode on dissolved oxygen are observed. It often is a consequence of the increased content in water of the easily oxidized organic chemistry.

Comparison of the obtained data with previous gives the grounds to consider that the tendency of stabilization of level of impurity of a coastal zone remains

© 2016 Global Journals Inc. (US)

e) Engineering coastal protective structure in the Sochi region

Wave damping wall there are on length of 81 km, beach protective groins - 40 km, wave breaking moles - 11 km and berm - 4,5 km. Thus in a complex these hydraulic engineering structures are executed on an extent only 56 km.

As it is visible from stated, the coast of the Sochi site by 1990 was rather saturated with coastal protective structures. It is explained by necessity of protection a resort infrastructure and railway.

However, system of coastal protective structures, adding up by 1990, did not ensure reliable fulfillment of coastal protective functions on a considerable extent of beaches. On data of the Sochi Geoecological center, average width of beaches in region was reduced since 1914 on 8-10 m.

The analysis of construction and operation of coastal protective structures allows marking their following negative consequences for the coastal zone:

- the submerged breakwaters do not ensure deduction of beaches without crosscut structures by the way groins. They conduct to deterioration of their stability and worsen conditions of water exchange in summer and reduction of capacity of self-wiping of waters of the coastal zone sharply;
- construction of the groin system practiced frequently without filling with an inert material of bays between groins. It results lined to interception of detrital deposits from an alongshore current by groins and to progressing of disastrous low fluid washes;
- blocking a dock space by groins also worsens a water exchange and self-cleaning of water in bays between groins;
- fulfillment of coastal protective measures in a contingency plan (the outburst on beach of building wastes, concrete blocks of the different sizes and bulk, cross ties etc.) gives void effect. But it also disastrously reduces aesthetic and recreational qualities of coast;

rigid regulation of beds of the rivers in an ostium part (the construction of concrete beds) conducts to sharp reduction of a solid drain;

the erection close set of wave breaking walls has reduced receipt of detrital deposits in an alongshore current at the expense of a coastal decline abrasion ;

the structure of wave breaking walls without beach retaining structures and artificial addition of detrital deposits speeds up fluid wash of a beach band (Yu.I. Dreizis, 2005, 2015, 2016; Serebryakov G.B., Grishin N.A., 2012; A.Yu. Lein, I.I. Rusanov, G.A. Pavlova, A. Meluzov, Z.I. Verkhovskaya, L.R. Merklin, M.V. Ivanov, 2009; T.B. Filatova, 2009; Goryachkin Yu.N., Kosyan R.D., Krylenko V.V., Nguyen Man Hang, Medvedovsky V.V., 2014).

The photographs of separate sites of a coastal zone of the Sochi region are indicated on photographs (Fig. 9-28). For creation and the protection of a beach were used various types of coastal protective structures. Efficiency of use of the chosen types of coastal protective designs is various.

All above mentioned, and also the development of new methods of the coastal protection, has reduced in comprehension of necessity of development of the new General schema of coastal protective and against a landslide measures (Yu.I. Dreizis, 2005, 2016; A.Yu. Lein, I.I. Rusanov, G.A. Pavlova, A. Meluzov, Z.I. Verkhovskaya, L.R. Merklin, M.V. Ivanov, 2009; T.B. Filatova, 2009; Serebryakov G.B., Grishin N.A., 2012; Goryachkin Yu.N., Kosyan R.D., Krylenko V.V., Nguyen Man Hang, Medvedovsky V.V., 2014).



Fig. 9: Destroying of the wave-breaking wall from the marine and coastal party for want of a wave



Fig. 10: The coast disfigured by groins and which lost the recreational quality

© 2016 Global Journals Inc. (US)



Fig. 11: Destroying of the wave-breaking wall from the marine and coastal party for want of a wave



Fig. 12: Example of destruction of a wave protective wall. The beach near the wall is small



Fig. 13: Example of destruction of a wave protective wall. The beach near the wall is small



Fig. 14: Creation and protection of a beach with use of a faltering breakwater



Fig. 15: Creation and protection of a beach with use of a faltering breakwater



Fig. 16: Protection of the shingle beach with using of the groin system and wave-breaking wall of the quay

© 2016 Global Journals Inc. (US)



Fig. 17 : Protection of the shingle beach with using of the groin system and wave-breaking wall of the quay



Fig. 18 : Protection of the shingle beach with using of the groin system



Fig. 19 : Protection of the shingle beach with using of the groin system



Fig. 20 : Protection of the artificial shingle beach with using of the groin system, wave-breaking wall of the quay and a long shore breakwater (beach of the 5*hotel "Black Sea")



Fig. 21 : Protection of the artificial shingle beach with using of the groin system, wave-breaking wall of the quay and a long shore breakwater (beach of the 5*hotel "Black Sea"



Fig. 22 : Protection of a landslide coast from the wave influence by installation of concrete blocks

© 2016 Global Journals Inc. (US)

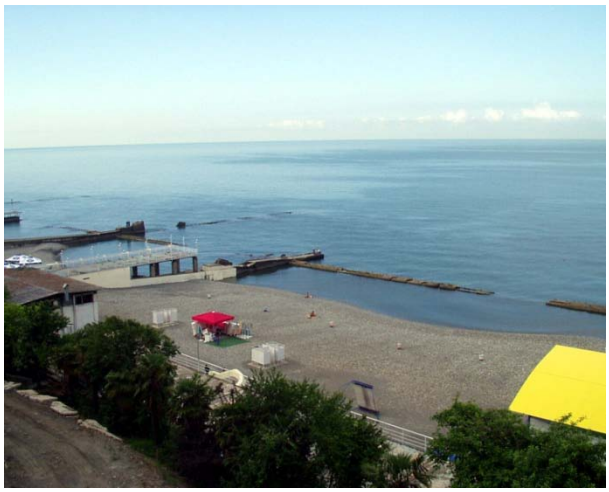

Fig. 23: Protection of the artificial shingle beach with using of the groin system and a long shore breakwater



Fig. 24: Protection of the artificial shingle beach with using of the groin system and a long shore breakwater



Fig. 25: Protection of the artificial shingle beach with using of the groin system and a long shore breakwater



Fig. 26: The classical architecture of the Sochi resort is not combined with a "classical" method of coastal protection



Fig. 27: Aqua-park, groin system in coastal and beach zones and moles of the port Sochi



Fig. 28: Aqua-park, groin system in coastal and beach zones and moles of the port Sochi

© 2016 Global Journals Inc. (US)

IV The Purposes of the General Coastal Protective Measures Schema Development and Availability of Reasonable Alternatives

The current state of coast of the Black Sea in general can be characterized as unsatisfactory. Now a considerable part (309 km) of coast of the Black Sea within Krasnodar Region of Russia are damaged to abrasion and landslide processes. The situation aggravates a problem of abrasion and washout of sea coast. The general exhaustion of beaches or their absence constrains resort construction. The listed complex of dangerous natural and anthropogenous processes demands acceptance of urgent measures for protection of coast of the Black Sea.

Thus, urgent need of development of the program of complex development of resorts of the Black Sea coast of Russia is obvious today. As a prototype of such program, the Concept of formation of a coastal zone of resort recreational system in borders of the resort town of Sochi can be considered.

The analysis of the existing condition of the coast of Greater Sochi showed that now on many sites of the coast of Greater Sochi beaches in the between groin compartments and for breakwater spaces have small width or in general are absent. Similar models of strengthening only spoil a coastal landscape and have no advantage. Meanwhile, now almost all coast of the central part of Sochi quite so looks.

Without beaches of Sochi cannot take the worthy place among modern resorts. At the first stage, beaches can be created on local sites of 2-3 km in combination with wave canceling constructions. Faltering breakwaters from sketches of a natural stone can yield good results, for example.

The central part of the Sochi coast needs radical reconstruction. Most likely, it is necessary to dismantle monofunctional reinforced concrete designs and to replace them with the constructions providing not only hydrotechnical, but also recreational functions. It is important to have a worthy facade from the sea and the modern wellplanned embankment for the city. It is obvious that without this Sochi, can hardly apply for the worthy post among resorts of the international class. As it was scored above, the coastal zone of Sochi is saturated with the enterprises of a SPA-hotel and transport infrastructure. Thus, the beaches in city boundaries are not only method of beach protection, but also major recreational objects involving in city a plenty of the tourists. So, on accounts of design institute of Hyprogor by 2010, the lump sum loading of beaches of Sochi region could constitute during the high season up to 500 thousand people. Thus, for maintenance of sanitary-hygienic norms the floor space of beaches as contrasted to existing should be enlarged with 180 up to 250 hectares. Thus the coastal protective measures executed according to the adjusted General Schema, were directional on reaching of the following basic purposes:

- stabilization of existing shoreline and landslides;
- protection of a cloth of the railway against destroying by hurricane wave;
- stabilization or extension of existing beaches and creation of new recreational beaches.

The indicated purposes according to the General Schema are reached by realization of particular engineering measures in a coastal zone of the sea.

Key alternative (not in a part of concrete design solutions) considered General Schema, as well as anyone to coastal protective measures, can be only total failure from interference in a course of coastal processes. Width of a dynamical part of a coastal zone (band of beach should be in this case determined, in which one the storm strains are possible) and the prognosis of its strains on a call-off quantity of years (for example, on settlement service life of those or diverse engineering structures, boarding houses, SPA-hotels, communications etc.) is made. After that the recommendations for accommodation of capital engineering structures outside of a dynamical part of a coastal zone are given. In the most dynamical part of a beach, the temporary objects can be located only.

However, such approach merits attention, as a rule, when the complex designing of large objects in a coastal zone from "zero point" is conducted. That is the object is designed on free, not built up and not run in inshore territory. Thus, the floor spaces on the part of beaches are not limited. For conditions of the Sochi region in view of extremely plenty of capital objects in a coastal zone such alternative is unacceptable. Thus, engineering activity, offered in General Schema, key reasonable alternatives are not present.

The main characteristics of the region are provided in table 3 and table 4 (Dreizis Yu.I., 2016).

© 2016 Global Journals Inc. (US)

Table 3 : Characterization of the region

Name	Phyisical charecte-ristics	Human charecte-ristics	Land / sea uses	Length of the coast	Landward boundaries for management issues	Seaward boundaries for mana-gement issues	Mana-gement issues	Scales to be taken into account
Sochi region	Region territory - 3500 км^2. It is divided into 4 administrative areas. The barrier from mountain ridges is one their features of environment. Mountains are covered by wood vegetation	The population – more than 430 thousand people. The population is occupied in tourist service, on transport, in trade, services, restaurant business, agriculture, fishery	Tourism restaurant business, trade, transport prevails	Extent of coastal line – 113 km. The area of beaches – about 220 ha. The width of shelf varies to 1 km	Tidal limit	Territorial waters (12 miles)	Erosion control, water quality. State of environment crisis. Anthropogenous pollution is considerable (dumps not enough pure sewage in pools of the rivers and in the sea)	Local Local/ regional Local/ regional /global

Table 4: Conflict matrix (The main using of coastal zone. Possible contradictions between branches of economy of region from the point of view of use of natural resources)

Activity	Port and harbor	Fishing	Shipping	Tourism	Industry	Transport	Sea Resort	Forestry	Agriculture	Global project «Olympic games 2014»
Port and harbour										
Fishing										
Shipping										
Tourism										
Industry										
Transport										
Sea Resort										
Forestry										
Agriculture										
Global project «Olympic games 2014»										

The legend: green – no conflict, yellow – slow conflict, red – strong conflict

© 2016 Global Journals Inc. (US)

The basic reasons resulting in to exhausting of an ecosystem of the sea are not removed:

- the industrial technologies do not answer modern requests in a part of a bionomics. The outlooks on their meliorating as soon as possible are not present;
- inefficiently work about half of complexes on clearing of sewages. Their reconstruction, introduction of elements of an after purification is required;
- a web of sewer headers in inshore cities and occupied points practically is not developed;
- the large part of deep water issues of sewages has damages and requires(demands) recovering with simultaneous magnification of their expansion;
- the shower waters from the floor spaces of urbane territories arrive in the sea without clearing.

The considerable influencing on state of a marine environment renders downthrows of pollutants in structure of sewages of the enterprises of a chemical and petrochemical industry, agricultural and municipal services.

Foregone halving of throughput of ports, bound with the geopolitical provision of Krasnodar region in scales of Russia, and the piling ecological situation in country uniquely will reduce in deterioration of a bionomics of the sea.

From total mass of bioorganic matters acting at a marine environment, the greatest share is necessary on municipal refining structures and on a surface drain from the floor spaces of downthrows. Last is the basic polluter of waters by pesticides.

The analysis of outcomes of overseeing by a natural marine environment in coastal areas of the Black sea and, in particular, in district of Sochi region (tab. 1), allows making following conclu-sions:

- for the last five years the quality of seawater was evaluated, basically, II (net), III (moderately contaminated), IV (contaminated) and V (dirty) classes of purity;
- the rather stable quality of seawaters valued by the III class of purity was scored in 1991 ;
- the tendency to magnification of the pollutions in the coastal zone was scheduled with 1992 on 1994;
- the quality of seawaters was improved, that, apparently, is explained by sharp reduction of number resting in 1995, on the contrary.

To basic technique effects on a coastal zone, influencing the railway unconditionally refers. Its activity near to beaches reduces their recreational qualities. Over quality of water exercise influence also navigation and industry of entertainments in a coastal zone.

Middle 80 years were a years of peak load on the Sochi health resort. These years the city accepted up to 3 million tourists for a season. It, on the one hand, allowed receiving the stable incomes, both urban budget, and ordinary to the citizens, but on the other hand result ined to stressful loads on beaches.

Coastal protective measures, reputed by the General Schema, in case of them technologically realizations by building organizations, will render by exact (according to the projects) following influencing on the parameters of the factors of an environment:

- on dynamics of a coastal zone and beach as its component element - positive;
- on hydrodynamics of an inshore dock space of the sea - positive;
- on quality of seawater in the coastal zone - negative;
- on progressing of coastal-marine biocenoses - requires padding study;
- on forming of coastal-marine landscapes - positive;
- on a quality of life and health of the people - positive.

V. Measures of Software to Prevention of Unacceptable Consequences Accomplishment of the Coastal Protection

The disorder of the Soviet Union has made the created earlier territorial associations on coastal protection unfit to execute by it functions of the customer, general contractor and operational organization in one face. It has reduced in unbalanced development of offshore coastal strip. The natural mode of coast was infringed; there were disastrous consequences as a result of natural problems. Simultaneously it has provoked losses of recreative valuable inshore territories, economically unjustifiable costs and fulfillment rather expensive compensatory of coastal protective measures.

There was a necessity to adapt philosophy of recreational progressing of the Russian Black Sea Coast for modern socio-economic realities, to define the pragmatic approach to development of inshore territories in reasonable combination scientific, ecology-economic, town-planning and engineering decisions.

a) Existing state of a coastal zone

The modern state of the coastal zone is unsystematic, frequently chaotic urbanizing of recreational zones of coast, destroying of existing engineering coastal protective structures and, thereof, degradation of offshore coastal strip as a whole with losses of a recreational potential.

Reasons of such state are:

- Uniform approach to coastal protective measure too absolutely miscellaneous natural mode sites of coastal zone in the Soviet time;
- Heritage of unreasonable solutions on minimization of the costs on alongshore transport mainlines (railway and automobile road);
- Functionally inexpedient usage of recreative valuable territories;

© 2016 Global Journals Inc. (US)

- Unwarranted construction and seizures of a coastal territory;
- The termination of budget and departmental financing of repair and reconstruction of existing hydraulic engineering structures.

Outcome of these operating are fluid wash of beaches, landslides, erosion of grounds, destroying non-repaired, non-optimum and of small effective hydraulic engineering structures and their influencing on the beaches.

The primal problem, which one faces to the Black Sea cities of Russia, can be formulated as follows: the transformation of an existing coastal zone in a modern recreational megalopolis with the purpose of maintenance is maximum of comfortable conditions for tourists at a high level of investment attractiveness of independent sites of coast.

As a result of systematization and analysis of source requests on territory protection, architectural appearance and engineering infrastructure, the following conceptual principles mortgaged in the new complex schema of coastal protection measures were determined (Dreizis Yu.I., 2005, 2016; Serebryakov G.B., Grishin N.A., 2012):

1. Principle of statehood. A coastal zone of the Black Sea coast of Russia - most valuable seaside recreational territory - "card" of marine health resorts of Russia.
2. Principle of a priority. Basic elements of seaside resort industry should become beach complexes and objects of an infrastructure of yachting. That the health resorts of Russia of steel marine, are necessary to the full are to involve by a huge recreational potential of the sea.
3. Principle of the landscape architecture. A synthetically framed landscape and architectural image should organically integrate in a historically adding up town-planning situation.
4. Principle by fissile coastal protection. Coastal protective structures should actively neutralize a wave action on defended territories and structures at their simultaneous stabilization.
5. Principle of reasonable urbanizing of territories. The objects of quay should grant tourists an indispensable level of comfort and spectrum of services, simultaneously not enabling transship-ment of valuable landscape-recreational territories.
6. Principle of a universality of structures. All engineering structures should be multifunction.
7. Principle of ergonomics. It is necessary to create maximum comfortable and secure environment for the tourists. It is impossible without transport service of objects. Therefore, it is required to divide foot and motor transportation streams with simultaneous magnification of there qualitatively - operation capability. It is necessary to bear from beaches technical zones of operation small ships and structure, tearing integrity of beach recreational complexes and tourists, endangering to health.
8. Principle of aesthetic environment. The engineering structures and architectural appearance of building are harmonic combined with a landscape and existing by style-definitive objects. For this purpose, it is necessary to transform engineering structures, tearing integrity of beach complexes and finding in an obvious dissonance with an enclosing contour and architecture.
9. Principle of indemnification of territories. Taking into account an existing deficit it is impossible to enable most popular and, accordingly, most visited recreational beaches, reduction of their floor space and expansions along a water boundary as a result of variation of a functionality.
10. Principle of ecology. Coastal protective structures and the engineering measures on development of declines and other territories should meliorate an ecological situation of an inshore dock space and contiguous territory.

b) Milestones of program - target development

The implementation of a program is expedient for realizing on the basis of regional potential at coordination by Administration of Krasnodar Region, having dissected it on following milestones:

1-st stage- Systematization, generalizing both estimation of efficiency and expediency of available operating time of a regional and federal level.

2-d stage - Wiring design of legal zoning of coast based on the acting nature protection acts.

3-rd stage - Development of the coastal zone circuit natural and urbanizing zoning for creation of its steady investment potential.

As a result of supervising and scientific studies on the Black Sea coast executed in 1960-1990 years by different organizations, the philosophy were produced, which one should be guided by at realization of coastal protective measures:

1. The angle diameter of fragments of a careering material used for creation of artificial beaches should be close to an angle diameter of fragments in a natural beach on the given site of beach.
2. Used for creation of the artificial beaches the careering material should contain no more than 35 % of fragments of factions (more finely 1-2 mms) and no more than 5% by large surges of large-sized including and to have a high scale of stability to an abrasive wear. The fulfillment of the given item will promote stability of a beach and will reduce up to the minimum a mechanical pollution of coastal waters.
3. At fulfillment building of coastal protective operations it is necessary to exclude clogging of beaches and of near located territories to them by

© 2016 Global Journals Inc. (US)

sub-standard grounds, building garbage, wastes of fuels and lubricants oils etc.

4. It is necessary to envision for their replenishment, clearing, exportation of garbage, and alignment etc. special technological roads at organization of beaches. They should be powered up together with beaches in the maiden zone of a sanitarian mode.
5. It is necessary to exclude a construction of submerged breakwaters on the coast, where the organization of recreational beaches is realized.
6. It is necessary in all cases to ensure filling again constructed and maintained of between groin bays with an inert material on an unformatted capacity. It should settle up in the concrete projects.
7. The second path of the North-Caucasian railway is necessary be for designing and for plotting only in the party of a land. It is necessary completely to exclude withdrawal of a beach band under the railway.
8. The regulation of beds of the rivers in wellhead sites should be organized on width, not less triple width of a channel, with the purpose of maintenance of the unconstrained passing of a solid drain.
9. It is necessary to be guided by the following rules from the point of view of architectural-landscape designing:

- the free beach is the best from all beach protective systems;
- it is necessary to prefer structures, not dangerous for bathing, the top which one is disposed below than sea level;
- it is necessary to prefer disposition structures in scheduled disposed alongshore and which are not shielding a view on the sea up to horizon;
- it is necessary to prefer structures engaging (borrowing) minimum percent(interest) of the floor space of defended offshore coastal strip;
- at designing cross-cut structures it is necessary to envision safety factor for construction on them of berths, aeratiums etc. with the purpose of provision is maximum of their useful usage;
- the constructions, acting above water, should be finished with the special carefulness and to attach them an aesthetic kind.

10. The artificial creation of beaches for the account addition, recommended as the basic method of coastal protection, demands longtime security by an inert material. The delivery of a material from careers is justified in the General Schema. Considering a deficit of an inert material on the Sochi coast and seller's price of its delivery to places of addition, it is expedient to consider a possibility of searches and exploration of an inert material on a underwater decline within the limits of marine depths, where its production is technically probable) and is economically effective.

The examples of planned engineering solutions of the Sochi region coastal zone (projects) are given in Fig. 29-31).

VI. Complex Monitoring of a Coastal Zone

Per the last decades the fissile attempts of creation of a different systems of automation of natural environment monitoring in all branches of engineering activity, bound with interplay of the person and nature are undertaken. To such systems it is possible to refer different types of the automized management systems (MIS), overall systems of forecasting and management of natural processes (SFMNP), automated design-engineering systems (CAD system) etc.

Under the direction of one of the writers the maiden sequential queue of the Automized System of Coastal Processes Monitoring (ASCM) is developed. The maiden sequential queue of the system was developed for the Kaliningrad coast of the Baltic Sea (Makarov K.N., Nikolenko A.A., 1992, 1994). The basic problem of development is the definition of an optimal complex of engineering measures on management of coastal processes by multivariate study of reputed administrative and design solutions. The speech goes about optimization of key solutions on the basis of forecasting change in length of coastal processes strokes. After acceptance of key solutions, their realization can be now projected by traditional methods or with applying of CAD system elements an already available in a design organization. The key solutions constitute a basis of the General Schema of coastal protection.

Within the framework of first-order development (ASCM) are decided both general-system problems, and problem of its preliminary adapting to concrete coast.

To general-system problems refer:

- development of pattern, structure and applicable software of the intellectual interfacing of the system;
- development of the complex automized system of forecasting and management of coastal processes (CS ICZM);
- development of pattern, structure and management system of the automized databank (ADB).

As a result of a solution of the indicated general-system problems, the pattern (ASCM) is created, which one basically can be adapted to coast of any tide less pool.

By information basis of all automized systems of monitoring, forecasting and the managements of natural processes, are the automized intelligence systems (AIS). Generally they execute following functions: the tax, processing, storage, map, adjusting and issue of the information. In frameworks AIS can be

© 2016 Global Journals Inc. (US)

in turn chosen (Makarov K.N., Nikolenko A.A., 1992, 1994; Yu.I. Dreizis, K.N. Makarov, I.G. Kantardgi, N.O. Sapova, 2003; Yu.I. Dreizis, I.V. Grigoriyn, O.E. Lobova, 2011):

- subsystem of data acquisition in field conditions (survey) and its primary processing;
- subsystem of input in a computer, transformation, editing, storage, map and issue of the information for consequent usage in CS ICZM or immediately by person.

It is accepted to call the second subsystem of the AIS as the Automized databank (ADB). Primal problems ADB of seashores are:

- maintenance by the indispensable information CS ICZM, and in the long term as well as CAD system of coastal protective measures;
- maintenance of user-friendly input, adjusting and information display;
- systematization of available dates on beaches and definition of defects ("holes") in their sets. It allows to organize targeted prospecting operations and by that to save the applicable material means.
- The indicated functions are ensured with two principal components ADB:
- database that is purely dates on beaches, coastal processes existing structures etc.;
- DBMS representing collection of particular software.

However, it is necessary to mark, that for final adapting of the designed system and its further information attending it is necessary to organize a complex of special fullscale supervising on sites of coasts, it adapts for which one.

It is offered to execute adapting AS ICZM to conditions of coast of the Sochi region that will allow organizing alongside with full-scale supervising, complex automized monitoring of beaches.

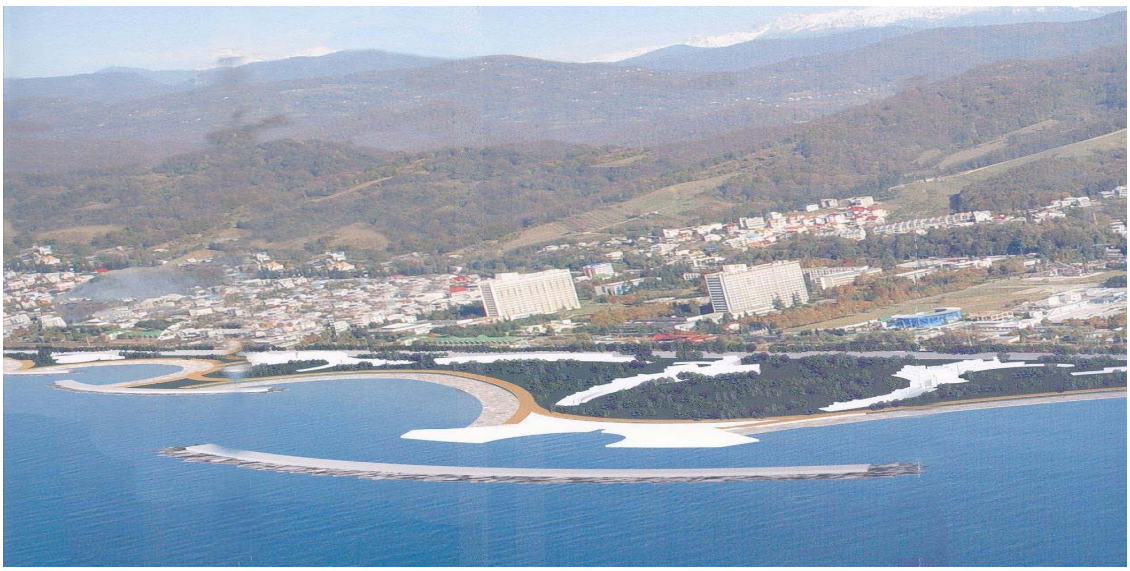

Fig. 29: System artificial bays with beaches, yachts - harbors and longitudinal breakwater



Fig. 30: System artificial bays with beaches

© 2016 Global Journals Inc. (US)



Fig. 31: The project on reconstruction of the main seaside embankment of Sochi with use of faltering underwater breakwaters of a macroporous design and the free pebble beach

VII. Conclusions

The international and domestic experience shows that there are many ways of effective protection of coast. Realization of this or that way depends not only on specifically current situation ashore, but also on the planned purposes of use of a coastal zone.

At assessment of impact of bank protection constructions on the environment it is necessary to consider consequences (negative and positive), both for nearby landscapes, and for all sea coast in general. When developing shore protection actions it is necessary to consider that the carriedout works did not cause damage to the environment, recreant, or it has to be minimum.

To estimate extent of influence of bank protection constructions, actions for strengthening of the coast on the environment, it is necessary to understand the nature of action of the considered means of a coastal protection in the beginning.

Creation of beaches in the form of bays is directed to improvement of natural conditions; this nature protection action. On coast with free beaches, free water exchange, which is complicated in the presence groins, is supported. Besides, the beach is not only a reliable engineering bank protection construction, but also an additional recreational facility. During creation of beaches, feed by its beach material is necessary.

Protection of coast against a wave erosion has to be carried out based on the regularities defining natural dynamics the of litodinamical systems. It is inadmissible to consider a problem of protection of coast as a problem of protection of certain sites of the coast, it has to be solved for all coast, or for several large sites (the litodinamical and coastal systems).

In addition, the most important – in the resort area only such design construction decisions that, along with ensuring protection of coast against destruction, will create at the same time the beaches that are actively used in the recreational purposes have to be applied.

As a result of an implementation of a program the following outcomes will be received:

a) Town Planning

- qualitative meliorating of functional usage of an inshore recreational zone of Russia Black Sea Coast;
- warning of unsystematic building of coast with exception of banal urbanizing territory;
- variation of architectural appearance of recreational and urbanizing complexes of a coastal zone by entering of principally new elements;
- creation of the district intensive yachting as element of the Mediterranean marine tourism.

b) Economic

- engaging of the off-budget investments;
- increase of substantial cost of the land lots of a coastal zone and of near coast territories;
- magnification of a commercial effectiveness of operation of objects;
- urging of progressing of new industries in locale; magnification of hotel capacitance of coast.

c) Social:

- creation of new jobs in different orbs;
- construction, household service, public catering etc.;
- progressing of peripheral districts of cities and districts;
- valuable using of coast recreational resources.

© 2016 Global Journals Inc. (US)

d) Ecological

- environmental sanitation of territory and of a near coastline dock space;
- positive influencing on litodynamic of coast and progressing of a biocenosis.

Accepted composition and the engineering solutions will allow creating ergonomic recreational environment of coast, without which one the organization of valuable and comfortable rest for the sea is represented rather doubtful.

The installment implementation of a program will reduce in forming a logical functional diagram that allows not only creating a modern seaside recreational megalopolis.

References Références Referencias

1. Browse of seawaters quality in a coastal zone of the Black and Azov seas for 1993 (1995). Krasnodar, Krasnodar edge committee on a natural conservation.
2. Allowance according to environmental impact (EEI) at development of the feasibility reports (accounts) of the investments both civil-engineering designs of economic objects and complexes (1992). - M.: The State Committee on a natural conservation.
3. Provision about an estimation of environmental impact in Russian Federation (1994). - M.: The Ministry of an environmental protection and natural resources of Russian Federation.
4. List of occupied points of Northern Caucasus with the indicating of seismicity accepted for them, in balls and recurrence of seismic effects (1995) - M.: Ministry of building of the Russia.
5. Makarov, K.N. & Nikolenko, A.A. (1992). A programmatic complex for account hidro- and litodynemics of the coastal zone of tide less seas, lakes and reservoirs // Hydraulic engineering construction, N11, pp. 11-12.
6. Makarov K.N. & Nikolenko A.A. (1994). The maiden sequential queue of the automized system of monitoring of the Kaliningrad coast of Baltic Sea // 4-th Conference "Dynamics and termic of the rivers, reservoirs, internal and adjacent seas" - Moscow: RNC IAGI, pp. 224-226.
7. Dreizis, Yu.I. & Makarov, K.N. & Kantardgi, I.G. & Sapova, N.O. (2003). The structure of the informational ecology-economic modeling system of the sea regions development by Sochi example // Proc. of Intern. Conference «On Integrated Coastal Zone Management and its Integration with Marine Science», 26-29 Sept., St. Petersburg, Russia – St. Petersburg, RSHU Publisher, 2003, p. 33-39.
8. Lein, A.Yu. & Rusanov, I.I. & Pavlova, G.A. & Meluzov, A. & Verkhovskaya, Z.I. & Merklin, L.R. & Ivanov, M.V. (2009). Flint Biogeochemical processes in the sediments of outward Russian shelf of the Black Sea. Geology of the seas and oceans // Materials XVIII of the International scientific conference on sea geology. Moscow, on November 16-20, Vol. IV, pp. 93-96.
9. Filatova, T.B. (2009). Expeditional hydrochemical researches in coastal and sea areas of the Black Sea Geology of the seas and oceans // Materials XVIII of the International scientific conference on sea geology. Moscow, on November 16-20, Vol. IV, pp. 168-172.
10. Dreizis, Yu.I. (2005). Black Sea Coastal Zone of Sochi Region – Problems and Perspectives of Development // Proc. of the Seventh Int. Conf. of the Mediterranean Coastal environment, MEDCOAST 05, E. Ozhan (ed), 25-29 Oct. 2005, Kusadasi, Turkey, v.2, 1025-1036.
11. Dreizis, Yu.I. & Grigoriyn, I.V. & Lobova, O.E. (2011). The primary goals of decision support system in management of sea coastal regions. European Researcher, №5-1 (7), May 2011, pp. 590-594.
12. Kryuchkov, V.G. & Eletsky, B.D. &. Kuzhel, M.Yu & Streltsov, S.V. (2011). Monitoring of coastal waters of the Black Sea coasts of Russia. // http://www.nbuv.gov.ua/old_jrn/natural/Skns/2011_15/articles/11kvgmpr.htm
13. Serebryakov, G.B. & Grishin, N. A. (2012). The review of methods of a coastal protection on the Black Sea coast of Russia // http://arch-sochi.ru/2012/10/obzormetodov-beregozashhityi-na-chernomorskom-poberezhe-rossii/
14. Kosyan, R.D. (2014). Environmental policy in Russian sectors of the transboundary seas coastal zone. Ecology of a coastal zone of closed seas. «Intertechnology», Gelendzhik, 2014, pp. 104-110.
15. Goryachkin, Yu.N., Kosyan R.D., Krylenko, V.V., Nguyen Man Hang, Medvedovsky, V.V. (2014). Regional features of management of coastal zones the Coastal zone – a prospection // Materials of the XXV International coastal conference. V.2. – M.: GEOS, 2014, pp. 187-190.
16. Kosyan, R.D., & Goryachkin, Yu.N., & Kry-lenko, V.V., & Nguyen Man Hang, & Medve-dovsky, V.V. (2014). Regional features of formation of the ICZM system. Ecology of a coastal zone of closed seas. - «Intertechnology». – Gelendzhik. – 2014. - pp. 15-19.
17. Rubtsova, S.I. & et. (2014). Materials of the youth scientific and practical conference «Environmental Problems of the Azov-Black Sea Region and Integrated Management of a Coastal Zone» (September, 29 – October, 5, 2014) / Editorship - S.I. Rubtsova – Sevastopol: EKOSI-Gidrophisics - 2014. - 226 p.
18. Kanonnikova, E.O. (2014). Geoecological situation of coastal Black Sea within the Greater. Modern Problems of science and education. V.5, pp. 1-7.

© 2016 Global Journals Inc. (US)

19. Kanonnikova, E.O. (2014) Ecology-geological situation of the water area of the Black Sea near Greater Sochi // Geology in developing world / Proc. of scientific works. T. 2. Perm, 2014. p. 146-150.
20. Dreizis, Yu.I. (2016). Integrated Coastal Zone Management is the Main Mechanism for Sustainable Development of the Sea Region (2015) // Modeling of Artificial Intelligence, 2015, Vol. (5), Is. 1, pp. 4-8.
21. Dreizis, Yu.I. (2016) Strategy of Coastal Marine Territories Development (on the Example of the Sochi Coastal Region of Russia). European Journal of Economic Studies, Vol. (16), Is. 2, pp. 331-34.

© 2016 Global Journals Inc. (US)