Organization of a Diving Program on the White Sea

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Abstract. The article describes a relatively new area of Russian tourist business – diving tourism. Diving, as one of the most powerful tools for rehabilitation offers two efficient options at once: a useful and not always accessible activity in everyday life and contemplation of an especially beautiful underwater world, therefore it can be included in the range of services of tour companies of the world. However, the possibilities of providing such services in the Extreme North of Russia are insufficiently studied and not wide-spread in tourism. Considering the fact that one of the principal factors of Karelian economy, a large part of which belongs to the Extreme North, must be tourist sphere, the region plans to develop active ways of recreation that can also include diving. In this situation, the development of a new tourist product on the White Sea is quite feasible. The history of the origin and development of underwater diving, the specifics of the organization of a diving tour, its development opportunities in the Far North have been considered. Interesting places for diving on the Karelian and Murmansk parts of the White Sea are presented. The program of the tour «Diving on the White Sea» has been developed, intended for implementation on the territory of the Louhsky district, which in addition to dives at interesting points, provides excursions to the biological station, the Panfilov Varaka Canyon, the historical and geological museum «Valitov Kamen». This article will be useful for the development of active types of tourism in the northern territories of the Republic of Karelia.

1 Introduction

The Republic of Karelia is located in the North-West of Russia and is washed in the south by the waters of Lake Ladoga and Lake Onega, and in the north-west by the waters of the White Sea. The White Sea, one of the inner seas of the Arctic Ocean, is located in the Extreme North of Russia, to the south of the Arctic Circle and is connected to the Barents Sea by a narrow strait. The sea is considered the smallest in the world after the Sea of Azov; its area is 90 thousand km², its depth reaching 350 m. Three regions of the Russian Federation are located on the shores of the White Sea: the Republic of Karelia, Archangelsk and Murmansk regions. On the Karelian side, trips to the Solovets Islands, visits to the Russian and German Kuzov are in most demand. The Karelian White Sea area includes territories of Belomorsky, Kemsky and Louhsky districts. Pomor villages provide

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opportunities for the development of ethnographic and wedding tourism; White Sea rock carvings - for cultural-educational and event tourism, natural resources – for ecological, water, photo, diving and wellness kinds tourism. New services and tours play a significant role in further development of the tourist sector in the region.

The goal of this research is to study the recreational potential of the White Sea for the development of an excursion diving program. To achieve this goal, the history of the origin and development of diving, the specifics of its organization were studied, the tourist potential of the White Sea was investigated and a diving program was developed. The main research methods included studies, analysis, systematization and summary of scientific literature and website materials. The sources of information also included normative legal documents regulating excursion activities and safety of active forms of tourism. We must admit that there is not much scientific literature on diving tourism, since this sphere started developing quite recently. For this article we used the works of the following authors: V.Ya. Berger, V.F. Bryazgin [1], V.G. Karpichev [2], V.M. Kitsis, D.V. Karpov [3, 4], Makarevich A [5], E.V. Nastaeva, M.S. Bezuglova [6], V.A. Nastashchenko [7], D.Yu. Yashenin [8].

2 The History of Diving and Specifics of its Organization

Underwater diving with breath-holding has been actively used since ancient times. But ancient divers could not dive to a depth of more than 30 meters, remaining under water for more than 2-3 minutes. This led to the need for the development of immersion technology. In the XVI century, divers began to use special bells, which were pumped with air, which allowed them to spend more time under water. Soon there was also a suit made of leather, which does not allow you to freeze and reduces the water pressure on the body, as well as a helmet that provides a constant supply of air. This allowed for conquering great depths [13]. By the 19th century thanks to the active research (Paul Burt, John Scott Halane) it was possible to explain the mechanism of pressure impact on the body and determine safe time limits for immersion with compressed air. The technological area developed as well. The coming of air compression and supply pumps, carbon dioxide absorbers, and air supply regulators made it possible to stay underwater for even longer [8]. In 1865 for the first time, the open-cycle breathing apparatus was invented, which was described by Jules Verne in the book “Twenty Thousand Leagues under the Sea”. At the end of the 19 century the first underwater photographs appeared. In the 20 century the first rubber fins were invented. A wetsuit with pressure-resisting joints was invented. The use of a mixture of helium and oxygen made it possible to dive to a depth of up to 153 meters. In 1943, French researchers Jacques Yves Cousteau and Emile Kalyan patented the invention of scuba diving, which makes it possible to stay longer under water; this contributed to the mass enthusiasm of the number of people who want to engage in underwater photography and video shooting [11].

By mid-1960s most drivers could purchase not only scuba gear, but also wet suits, underwater pressure gauges, and buoyancy compensators developed on the basis of life jackets. The professional association of scuba diving instructors ПАДИ (ПАДИ) was organized in 1966; now this organization controls over 75 % of the world diving market and unites most divers of the world, including our country. The modern geography of diving tours covers practically all corners of the world; especially popular among divers are water bodies of Greece, Indonesia, the Philippines, Maldives, South Africa and Norway [12]. Diving came to Russia at the end of 1990s, when first diving clubs appeared [2]. By 2020 diving not only in natural reservoirs, but also in flooded mines, industrial facilities, cave diving and free diving began to develop actively. There was demand for diving services for people with disabilities.
Organization of diving programs has its own specifics. To dive into the underwater world, one must complete a training course. In most cases it takes place in a swimming pool under the guidance of an experienced instructor. Before purchasing the tour, one must undergo medical examination, since a number of conditions are incompatible with diving, including chronic runny nose. When planning a diving tour it is necessary to take into account unpredictable circumstances, particularly, unfavorable weather conditions [8]. One must arrange hotel accommodation close to the diving spot; it can also be a floating structure. The recommended length of a diving tour is 3 to 14 days; the group must not be larger than 10 people [11]. There are no strict age limitations for diving enthusiasts: it is possible to organize special programs for children as well as elderly people. An important safety condition is to observe the time limits and depth of the dive. The maximum diving depth, which is determined by the rules of recreational diving, is 40 meters. It is mandatory to have insurance, which provides not only for the services of a doctor, but also for the delivery of the victim to the place of rehabilitation. It should be based on existing legal and regulatory documents: GOST 32611-2014 “Requirements for ensuring safety of tourists”, the date of enforcement 01.01.2016; standards EN/ISO: GOST R ISO 11121-2012 “Diving for active recreation and entertainment. Requirements for initial training programs in scuba diving”, enforcement date 01.09.2013; GOST R ISO 11107-2012 “Diving for active recreation and entertainment. Requirements for enriched air (nightrox) diving training programs”, date of enforcement 01.09 2013, GOSTs related to diver and diving instructor training.

3 Possibilities for the Development of Diving on the White Sea

On the territory of Karelia there is the diving center «Polar Circle» and Petrozavodsk dive-club «Onego», which provide services for servicing, sale and rent of equipment, organization of drive safari and training in free diving [14]. On the basis of the water sports center «Aquatica» there is training in the basics of diving. The training and recreation center «Urozero» offers trial dives, initial and second-stage training, as well as services for experienced divers. The Ruskeala Diving Center offers trial diving, cave diving and ice diving. In this paper, we will focus on the possibilities of the center «Polar Circle».

It is situated in Louhsky district, in the village of Nilmoguba. A children’s camp, diving center, dolphinarium, excursion and spa center function on its basis. Around the year, the tourist company Diving LLC jointly with RuDIVE and dive center «Polar Circle» offer different diving tours on the White Sea [15]. Since diving on the White Sea is only possible in a dry suit, one must have experience of such dives.

Diving on the White Sea is interesting both for educational purposes thanks to the opportunity to get acquainted with the diversity of the underwater world, and for aesthetic purposes through getting impressions of the beauty of the underwater world. The underwater world of the White Sea is rich and unique. The surface of the rocks is covered with actinia (Lat. Actiniaria), sea squirts (Lat. Ascidiacea) and hydroids (Lat. Hydrozoa). In the cracks and between stones there are starfishes (Lat. Astroideia), brittle stars (Lat. Ophiuroidea), crab (Lat. Brachyura) and shrimp (Lat. Caridea). Fish are represented by lancet fish (Lat. Anarhichas), haddock (Lat. Sebastes), flatfish (Lat. Pleuronectes platessa), sculpin, eelpout (Lat. Zoarces viviparus) and lump fish (Lat. Cyclopterus lumpus). One can see sea slugs (Lat. Nudibranchia), hermit crab (Lat. Paguroidea), endemic large gastropod predatory scallops — Neptunea и Bukcinum and most rare serpent stars with an exotic name the Head of Gorgona (Gorgonocephalus). In the White Sea there are mainly plantations of seaweed fucus and kelp. On the island rocks there are various bird markets in terms of species composition. Cormorants (Lat. Phalacrocorax), seagulls (Lat. Larus), terns (Lat. Sterna) and other birds nest here. Of the mammals, there is Greenland seal (Lat.
Pagophilus groenlandicus), eared seal (Lat. Pusa) and northern beluga whale (Lat. Delphinapterus leucas) [9].

In Karelian and Murmansk parts of the White Sea we can indicate the following places for diving:
- Not far from the village of Chkalovsky, you can dive near the islands of the Chupskaya Bay; there are still flooded quarries from which feldspar and mica were once extracted, you can also explore the submerged boat “Yaroslavets”.
- In the area of Kishkin Island, you can see canyons and grottos under the water; this offer is for experienced divers, as the grotto is located at a depth of 22 meters. Not far from Kishkin Island is Keret Island, where diving is possible for beginners.
- During dives off the Kastian Island, an almost vertical wall opens up, illuminated by the midday sun, with bright growths on the ledges of the rock and shellfish. At the bottom are starfish, and in the crevices of the rock you can see sea fish. There is good visibility here, about 20 meters. Nearby is the scientific base of the Moscow University, which studies the underwater world of the White Sea.
- In the Great Salma Strait, near the islands of the Kandalaksha Nature Reserve, you can dive on the tidal current, the speed of which reaches 2m/sec.
- Diving in the area of Krestovsky Islands, divers can see a rock overgrown with giant actinia from the Metridium family. Here one can see starfish Urasterias and a very rare Ophiuroidea Gorgonocephalus (Gorgona’s Head). Deep down, a bank is located, the steep northern slope of which goes deep to 50 m, and the gentle southern slope reaches depths of 28-30 m. The diameter of the bank is about 15-20 m and there is a sunken small fishing boat 12 m long.
- In the Biofilter Harbor the diving takes place near the steep rocks over their picturesque rubble.
- At Cape Kindo, the depth of diving increases gradually and reaches 50-70 m. There is a well-defined belt of kelp and other brown algae. The bottom is home to cold-weather species Urasterias and Pteraster, you can find large gastropod predatory mollusks of the White Sea — Neptuna и Bukcinum.
- In the strait between the islands of the Russian and German Kuzov, you can dive in the current at a speed of up to 4 m/s. The diver, hovering in the water column, is swept by the current over the kelp thickets and huge sponges, and unusual rocky landscapes open up below him [9].

Among the objects of attention of tourists on the White Sea, three biological stations should be noted: the Zoological Institute of the Russian Academy of Sciences “Cape Kartesh” in the Krivozersk Bay of the Kandalaksha Bay, the St. Petersburg University on the island of the Middle Keret Archipelago of the Kandalaksha Bay, the White Sea Biological Station named after N. A. Pertsov of the Lomonosov Moscow State University on the Kindo Peninsula. The staff of the stations conducts experiments, make observations, collect materials in the natural environment, and students practice at the biological stations, getting acquainted with the living objects of nature.

On the basis of the aforementioned resources we can present the following option of a diving tour «White Sea Diving». This tour will follow the route: Chupa village – Nilma village – Primorsky village – Cape Kindo – Kostian Island – Chernaya Rechka village – Nilma village.

Its duration is 6 days / 5 nights.

The main target audience will be diving and underwater photography enthusiasts who have diving experience, as well as their families.

The route begins in the village of Chupa (Louhsky district), which since the XVII century has been the center of the Russian mica industry, and since 1922 the place of active extraction of feldspar, quartz, and hematite. Here you will get acquainted with the
exposition of the historical and geological museum «Valitov Kamen». Next, tourists move to the tourist center «Polar Circle», which is located in the ancient village of Nilma. On the basis of the center, you can get acquainted with white whales-belugas, which are kept in an aviary. Diving with belugas is a very interesting experience for divers and underwater photographers. For family members, we can offer a wellness program «Detox», as well as dog sledding.

The first test dive takes place 1 km from the place of residence on Cape Kindo. There, the depth of the sea increases gradually, the bottom relief is represented by a gentle slope reaching depths of 50-70 meters. During the dive, you can get acquainted with brown algae, hermit crabs, crabs and starfish. The second dive is provided near the island of Kastian, where the divers can see a well-lit almost vertical wall, on the ledges of which the mollusks slowly move, and the sea stars peacefully lie on the bottom. Divers are delivered to dive sites by speedboats and in winter by snowmobiles.

For a variety of services for divers and to ensure that their family members are not bored, we can offer the following excursion services: to the canyon Panfilova Varaka («mountain» in Karelian), where they used to extract permatite, quartz and mica. It is situated near the Great Salma Strait. This low hill covered with pine trees with a flat, wide top is cut in two by a gorge, where you can see the scars from blasting. Pegmatite mining was active here in 1930s, done manually by GULAG inmates. At the top of the mountain is a wooden geodesic tower – triangular. A beautiful panorama opens up from the mountain top. You can visit the Blinkova Varaka Mountain, which is a walk in the woods with a geological excursion along a picturesque canyon with terraces. One must also visit the MSU Biostation in the Primorsky village. Its history spans more than 70 years, during which time the biostation collected unique scientific material on the biology of the White Sea. The objects to be seen are the educational and scientific center itself and the Botanical Garden named after Voskresensky and Vekhov, and the Water Supply Lake. An excursion to the village of Chernaya Rechka is possible either by water or by snowmobile. The village is isolated from people, there is no road leading there. But the locals have restored the church and can introduce you to the history of the village and take you to the waterfall.

In 2020 a new service was offered to the tourists – an exhibition of pictures under the ice; the only gallery in the world placed under the water near the diving center. The canvases of the picture gallery on special plastic resistant to salt water are attached to the ice of the White Sea and held down by lead weights. The plot of the pictures shows the underwater world of the White Sea. These are works of the National Geographic photographer Viktor Lyagushkin and artist Denis Lotarev. It was visited not only by divers from Russia, but also from China, Germany and France [10]. During this program, tourists are invited to take photos to participate in the contest of the best works and post them on the website. For the constant interest of drivers, we can offer ideas for creating an underwater museum; such an experience is being implemented in different countries of the world. For those who do not dare to dive, for family members of divers, we can organize virtual underwater excursions.

4 Conclusion

The desire of modern tourists to test their own abilities, get new sensations, a high degree of eventfulness in a short period of time, completely coincides with such a type of modification of extreme tourism as an excursion diving tour. The analysis of the natural, historical and cultural resources of the Arctic zones of the Republic of Karelia revealed the possibility of developing extreme diving tourism on the White Sea. The program will be interesting for both tour operators and independent tourists who are looking for new places to dive and new experiences. In order not to lose the momentum gained in attracting
travelers to the region, it is necessary to expand the range of tourist services for diving and its geography. We can connect with the common idea of diving in Karelia these places: the White Sea, Urozero Lake (Clear Lake) in Pryazhinsky district, Ruskeala canyon in Sortavalsky district, lakes Ladoga and Onego. Besides these places for diving, other water bodies located in remote districts of Karelia can be of interest as well. This could be lake Syamozero (Suojarvsky district), lakes Vodlozero and Chukozero (Pudozhsky district), as well as others suitable for diving requirements. Diving tourism in general can be an independent tourist attraction in a remote area. The selection of suitable reservoirs is carried out after the initial dives of the organizers. This can happen within the framework of the expedition activities of scientific and educational organizations, which, with joint cooperation, can conduct comprehensive research aimed at studying the flora, fauna, water space, etc.

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