Diving in the most amazing part of the Mediterranean
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The maps are informative and not navigational.
Diving location coordinates are determined according to Google Earth application.

Cover underwater photograph: Coralligen – Velika Panitula. Photo: Petar Kružić
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The region with most islands in the Mediterranean Sea

Fantastic harmony of 285 pearl islands and crystal-clear blueness
The Šibenik – Knin County is situated in the middle part of the Croatian Adriatic Sea, with a surface area of 5670 km². It is equally land (2994 km²) as it is sea (2676 km²). The coastal part is extremely indented, consisting of many bays and over 280 islands, islets and rocks, among which the islands of Kornati stand out.

Among the many diving destinations on the Mediterranean, the Šibenik underwater is certainly one of the most interesting because of its natural and geographical characteristics. The evidence for its value is recognized by the numerous protected sea areas (National park Kornati, Žut – Sit island group, Channel – Harbour in Šibenik and over 30 localities within the national ecological network).

When it comes to diving in Croatia, Šibenik area has the longest, over 300 years old tradition. In the 19th century, the inhabitants of the island of Krapanj near Šibenik dived for sponges using diving suits, while the inhabitants of the island of Zlarin were famous coral hunters.
The Šibenik–Knin County

Climate: The coast and islands – Mediterranean climate with hot and dry summer, and moderately cold and humid winter. According to Köppen, climate type Csa.

Winds: Bura – from the north-eastern direction; the strongest during the winter; blows fitfully; cold and dry Jugo – from the south-eastern direction, warm and humid. Often brings a lot of rain. Maestral – from the north-western direction; blows from the sea to the land in the warmer part of the year.

Air temperature: 

MIDDLE MONTH AIR TEMPERATURE IN ŠIBENIK
Rainfall:

**MIDDLE MONTH RAINFALL IN ŠIBENIK**

<table>
<thead>
<tr>
<th>Month</th>
<th>ml rainfall/m²</th>
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<tbody>
<tr>
<td>1</td>
<td>50</td>
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<tr>
<td>2</td>
<td>60</td>
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<td>3</td>
<td>70</td>
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<tr>
<td>11</td>
<td>70</td>
</tr>
<tr>
<td>12</td>
<td>80</td>
</tr>
</tbody>
</table>

Sea temperature:

**VERTICAL PROFILE OF AVERAGE SEA TEMPERATURE IN VARIOUS MONTHS**

Salinity:

Outside the influence of the river Krka – around 38 ‰.
Sea transparency: Sea transparency is the highest during the summer and the lowest during the winter. The transparency increases with distance from the coast. During the summer, on external islands, the highest underwater visibility reaches 30 m.

<table>
<thead>
<tr>
<th>AREA</th>
<th>SUMMER</th>
<th>WINTER</th>
</tr>
</thead>
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<tr>
<td>NEAR THE SHORE</td>
<td>18 – 23 m</td>
<td>10 – 15 m</td>
</tr>
<tr>
<td>EXTERNAL ISLAND</td>
<td>21 – 29 m</td>
<td>16 – 22 m</td>
</tr>
</tbody>
</table>

Sea currents: The main direction is SE – NW. The strength and direction are determined by the location of islands and land, and are the strongest in the channels and around capes surrounded by deep water.

Tides: Small amplitudes, 1 m max.

Shore and sea The coastal part is rocky. Sea bed is usually shaded to approximately 10 m, and then becomes sandy. After 40 m depth it becomes muddy. On the islands, the coast is mostly rocky, and after 40 m sandy.
Rocky sea coast and shallow rocky sea bed, with dark outlines of seagrass *Posidonia oceanica*
Protected natural sea areas

You have certainly heard many times that a region or a country is special or very diverse. Some areas are called pearls or jewels; many are unforgettable and simply must be visited. What can one say about the Šibenik – Knin County and its natural values? It is simply the best!
The protected sea areas in the Šibenik – Knin County are categories of national park, significant landscape and part of the national ecological network.

**National Parks** is spacious, mostly untouched land and/or sea area with extraordinary and multiple natural values. It includes one or more preserved or slightly changed ecological systems, and is primarily intended to preserve original natural values.

A **Significant Landscape** is a natural or a cultivated area of high landscape value and biological diversity, cultural-historic value, or a landscape of preserved unique features characteristic of an area.

**The Ecological Network** is a system of interconnected areas important for preserving endangered species and habitats.
With its physical, chemical and biological characteristics, this locality is a sea. Its final form, as we know it today, was formed 10 000 years ago, when the sea level rose 100 meters.

This locality includes the lower part of the river Krka, from the old Skradin Bridge to Šibenik Bridge, with the adjacent coastal area. Within it is the city of Skradin and Prukljan Lake (second in size in Croatia – 11, 5 km²), the mouth of the river Guduča (extremely valuable ornithological locality) and St. Josip channel. On Prukljan Lake there is the small island of Stipanac. On the bed of this lake we can see the remains of ancient Roman buildings – "Gavanovi dvori". Due to the rise in sea level the former ruins are today interesting diving areas.

Because of mixing of fresh and salty water, Prukljan Lake is a famous nursery for various fishes, especially the commercially valuable species of seabass, mullet, gilt-head sebream, eel and conger eel.
This locality includes the area from Šibenik Bridge to the end of St. Ante channel, i.e. to the St. Nikola fortress, with associated coastal area. This area can be divided into two parts: Šibenik bay and St. Ante channel. Numerous bays and capes are one of the most important landscape values. Inside this landscape there are two rocks, on which stand lighthouses. The first rock, called Ročni, is situated at the end of the channel, with an attractive diving location beneath. The second rock is situated at the very entrance to the channel, called Paklena. At the end of the channel there are two unusual islands – Školjić and Ljuljevac. They are close to the shore and were connected by rocks, pebbles and sand. The bay and the channel are rather deep, approximately 30 m. Maximum depth in the bay is 45 m, and in the channel 41 m. At the channel entrance there is St. Nikola fortress, built between 1543 and 1547, it is interesting for divers. Through its genesis, this locality is a typical flooded lower part of a river valley, that was finally shaped 10 000 years ago, after the sea level rose around 100 m. Because of its morphological and hydrological characteristics, it is often called an estuary.
Kornati is the richest island group in the Mediterranean Sea. It is situated in the middle part of the eastern Adriatic coast. It is divided into four parallel island groups named after the main island within each group: Piškera, Kornat, Žut and Sit group. The islands of Kornati are situated between the island of Žirje in the southeast and the island of Dugi otok in the northwest. Towards the mainland, in the northeast, the islands of Kornati are surrounded by the islands of Pašman, Vrgada and Murter, while in the southwest they are completely exposed to the open sea. They include around 140 big and small islands and rocks, in an approximate surface area of 300 km$^2$ (the islands are 69 km$^2$). The islands are 35 km long and they stretch from northwest to southeast. At their widest they are 13 km, stretching from the northeast to southwest.
This island group is surrounded by the islands of Pašman (in the north), Vrgada (the east), Dugi otok (the west), and Kornat (the south). It contains 35 islands of various size, eight rocks and one reef. The biggest island is the island of Žut (14,8 km²), and the second in size is the island of Sit (1,6 km²).

In this area, karst is the main relief characteristic and in all the islands we can see the beauty of karst relief shapes. The coast is characterized by bays and small lagoons, pronounced capes and sandy beaches. The uniqueness of this area is visible in the extreme beauty of natural landscape of this archipelago. Most visible is the contrast of the blue sea and land with carbonate rocks, covered in sparse vegetation.

In this locality, a strictly protected species of sea mammal lives – the bottlenose dolphin (Tursiops truncatus), as well as one reptile – the loggerhead turtle (Caretta caretta) and 62 endangered species of fishes.

There are five protected fish species – the dusky grouper (Epinephelus marginatus), common bream (Pagrus pagrus), brown meagre (Sciaena umbra), bluefin tuna (Thunnus thynnus) and common drum (Umbrina cirrosa). Two species are strictly protected: the long–snouted sea horse (Hippocampus ramulosus) and the green wrasse (Labrus viridis). Neptune grass (Posidonia oceanica) is also very frequent.
NP Kornati includes 89 islands, small islands and reefs with a surface area of 218 km², and a coastline of 238 km. The islands’ surface is around 50 km², i.e. around a quarter of total national park surface. The basic phenomena of this national park are the landscape, the islands’ geomorphologic beauty and the rich sea life. A geomorphologic uniqueness and a distinctive feature of this national park are coastal the slopes, called crowns, i.e. rocks situated on the outer part of the islands, stretching both under and above the sea. The highest crown is on the island of Klobučar (82 m above sea level) and the longest one on the island of Mana (1 350 m). The deepest ones are on the islands of Piškera and Rašip veli (over 90 m).

National Park Kornati hides exquisite biological diversity in its underwater world, preserved by its long-term protection. Besides Neptune grass settlements,
which inhabit the largest surface area of the shallows (to 40 m), well-lit sea beds, coralligenous habitats with numerous species in vertical cliffs are especially interesting. Among them, we must mention the “forests” of red gorgonian colonies (*Paramuricea clavata*) and large crabs: **common lobster** (*Homarus gammarus*) and **spiny lobster** (*Palnirus elephas*).

So far, 352 species of algae are on the list of Kornati underwater species (13 endemic), as well as three Adriatic seagrasses, 22 coral species, 177 molluscs, 55 decapod crabs, 64 echinoderms and 160 fish species. It is supposed, and confirmed with each new data, that the number of species is significantly larger.

The park’s waters are inhabited by populations of **bottlenose dolphin** (*Tursiops truncatus*), and very often **loggerhead sea turtle** (*Caretta caretta*). More on [www.kornati.hr](http://www.kornati.hr).
National ecological network

The national ecological network includes ecologically important areas of international and national value. It is a system of areas important for endangered wild species and habitat types that are interconnected by corridors, which enables communication and species exchange. In the Šibenik – Knin County area, 18 marine sites are included in the ecological network.

Zmajevko oko (Dragon's eye)
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<td>big shallow coves</td>
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<td><strong>2. ŽIRJE – KABAL</strong></td>
<td>Sandy sea beds, big shallow coves, Neptune grass settlements, reefs</td>
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<td><strong>3. KOSMERKA – PROKLADNICA – VRTLAC BABULJAK – UNDERWATER</strong></td>
<td>Biocenosis of infrallitoral algae, reefs</td>
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<td><strong>4. BLITVENICA</strong></td>
<td>Reefs</td>
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<td><strong>5. SEDLO UNDERWATER</strong></td>
<td>Biocenosis of infrallitoral algae, reefs</td>
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<tr>
<td><strong>6. TETOVIŠNJAK – UNDERWATER</strong></td>
<td>Biocenosis of infrallitoral algae, reefs, Neptune grass settlements</td>
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<tr>
<td><strong>7. TRATINSKA AND BALUN COVES</strong></td>
<td>Sandy sea beds, big shallow coves</td>
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<td><strong>8. KAKAN CHANNEL</strong></td>
<td>Neptune grass settlements</td>
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<td><strong>9. KAPRIJE</strong></td>
<td>Neptune grass settlements</td>
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<tr>
<td><strong>10. KUKULJARI</strong></td>
<td>Biocenosis of infrallitoral algae, reefs, Neptune grass settlements</td>
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<td><strong>11. TIJAŠNICA COVE</strong></td>
<td>Big shallow coves</td>
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<tr>
<td><strong>12. MURTER CHANNEL</strong></td>
<td>Big shallow coves, biocenosis of infrallitoral algae, Neptune grass settlements</td>
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<td><strong>14. RONČIĆ</strong></td>
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<td><strong>15. COVE STIVANČICA</strong></td>
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<td><strong>16. COVES AROUND CAPE PLOČA</strong></td>
<td>Reefs</td>
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<td>Sea caves, suprallitoral facies of karst sea lakes, community of mediollitoral karst sea lakes, karst sea lakes infrallitoral, circallitoral of karst sea lakes, coastal lagoons</td>
</tr>
<tr>
<td><strong>18. ZMAJEVO UHO</strong></td>
<td>Sea cave</td>
</tr>
</tbody>
</table>
Biology of typical diving sea beds
Although there are various habitats in the Adriatic, tourist diving is only done in some sites – the visually most interesting ones. Diving usually begins on shallow rocky sea beds with light-loving algae, continuing on sandy sea beds and dense Neptune grass settlements. If the sea bed falls steeply down at 30 m, it becomes a rich coralligenous community with organisms like gorgonians. On flat sea beds deeper than 30 m, sandy sediment is mixed with the remains of organisms that live here and build detritic sea beds. Caves, mostly shaped in the ice-age, are inhabited by organisms adjusted to life in the dark.
Shallow sandy sea beds

Shallow sandy sea beds are found from the surface to approximately 25 meters in depth (Image 1). Although at first sight they seem poorly inhabited, numerous interesting organisms live on these sea beds.
First we notice sea cucumbers that lie almost lifelessly on the sea bed (Image 2). However, their role in the ecosystem is extraordinary. They swallow the sediment and extract organic matter from it, thereby purifying the sediment and making it softer and favorable for other organisms to live in. However, when the reproduction period arrives (early summer and autumn), they become extremely active. Within several minutes, all the sea cucumbers from an area will climb to a raised place, such as rocks or Neptune grass. They become erect, leaning on the bed only with the back of their body. Through their reproductive opening, placed on their front, they soon start periodically releasing the gametes (Image 3). Males release a white fluid containing spermatozoids, and females release clouds of reddish eggs. The reproduction process can last longer than an hour, after which they go back to the calm life on the sea bed. It has not been discovered what stimulates them for reproduction. It is often in relation to the weather, such as the arrival of storm or Jugo wind.

Two groups of fishes are typical inhabitants of sandy sea beds: weever fish and flat fish. Weever fish (Trachinus spp.) (Image 4) are often buried in the sand, with only their eyes showing. They are predators and they abruptly strike out of the sand to attack small fish and crabs. The spines on their back fin are poisonous, which probably gives them the security to run away from divers only when they come extremely close. Flat fish, on the other hand, such as true soles – Soleidae, are secure because of camouflage. Lying calmly on the sea bed, they adjust the color of their body according to the color of the background, making themselves hardly noticeable. They feed on invertebrates like crabs and bristle worms.
A very unusual group of echinoderms also lives on sandy sea beds. Their name, *irregular echinoderms*, was given to them because of their irregular shell, which is not round (like in most echinoderms), but heart-shaped (*Image 6*). Their spines are small and bristly. They are rarely seen, because they live buried in the sand. Conversely, the tender white shells that remain after their death are frequently seen on sandy sea beds (*Image 7*).

The *red comb starfish* (*Astropecten aranciacus*) (*Image 8*) is an organism which lives on sandy sea beds and feeds on shells, snails and smaller starfish. Red comb starfish spends most of their day buried in the sand, being active only in the twilight and night.

If we get very close to the sandy sea bed (approximately 10 cm) we might get the illusion of the sand moving away from us. If we look better, we will see that it is not sand, but tiny snail shells with *hermit crabs* inside. In some places we can find hundreds of them within a square meter, a millimeter apart from each other. As they grow, they must keep finding bigger shells in order to protect their soft back. Some species find additional protection in red anemones, where they live a symbiotic life (*Image 9*). The red anemone protects the crab with its poisonous tentacles, and collects the food remains from the crab.

The *tun snail* (*Tonna galea*) lives in the sand, as well as in Neptune grass (*Image 1*). It is the second largest snail in the Adriatic Sea. Sea cucumbers are believed to be its basic food item. Another snail, the *thousand-spotted moon-shell* (*Naticarius stercus – muscarum*) (*Image 10*), buries itself in the sand during the
day and by night it crawls in the sand and looks for bivalves, on which it feeds by sucking out their flesh.

Bivalves are numerous on sandy sea beds. Some species make openings in the sand, through which we can see where they live. One of them is smooth clam (*Callista chione*) (Slika 11). Through an opening in the sand, it sucks in the sea, filtering plankton. It is one of the most beautiful bivalves, and is special and unique because of its shine and brilliance. After bivalves die, the waves and sea currents crush their shells, which become a part of sandy sediment (Image 12).

Cnidarians also live on sandy sea beds, especially the golden anemone (*Condylactis aurantiaca*) (Image 13). It is an endemic organism of the Mediterranean Sea. Among their 96 tentacles, situated in 5 circles, we can often find a beautiful shrimp of the genus *Periclimenes*. 
Shallow algae settlements

On the firm sea bed, to approximately 30 m in depth, develops a community with light-loving algae – algae that require a lot of light for their growth (Image 1).
In this region, areas with reduced visibility or in shady places, the maximum depth that these algae can be found is only ten meters. Algae are important because they produce organic matter and oxygen. Algae settlements and individual algae are home to many mobile and immobile animals – from fish to microscopic small crabs. Most algae, with some exceptions, like the rare green specie *Caulerpa prolifera (Image 2)*, need a firm sea bed in order to grow properly. Unlike seagrass, algae do not grow on sandy and muddy sea beds. Algae grow seasonally, so the appearance of the algae settlement may change. Adriatic algae are best developed during spring.

In the Croatian underwater there are around 640 algae species, which are grouped into red, brown and green algae. The most significant algae in Adriatic shallow sea beds are brown algae of genus *cystoseira (Image 3)*. Around 15 species have been found in the Adriatic. They inhabit firm sea beds from the very surface to 40 m in depth. Certain species, such as *Cystoseira spinosa (Image 4)*, can live up to thirty years. Their settlements can be compared to small tropical forests. Their body is usually densely inhabited by other algae and animals, just as tropical forest tree tops are inhabited by epiphytic plants and animals.
A single alga *Cystoseira* can have over 30 species of other small epiphytic algae species on it's body.

On the rocky sea bed, under the tops of *Cystoseira*, live algae species that require less light, invertebrates like crabs, sea snails and sea shells. In algae settlements, we can find many species of fishes, like *mediterranean rainbow wrasse* (*Coris julis*) (Image 5), *stripped mullet* (*Mullus surmuletus*), *annula seabream* (*Diplodus annularis*) and various *wrasses* (*Symphodus* spp.). In shallow sea beds we can see colorful *blennies* (*Blennius* spp.) and territorial *triplefins* (*Tripterygion* spp.) (Image 6). Algae settlements are also home to larger fish species, such as the *black scorpionfish* (*Scorpaena porcus*) (Image 7) and the territorial painted *comber* (*Serranus scriba*) (Image 8) and fishes in groups, like *two-banded seabreams* (*Diplodus vulgaris*) and *white seabreams* (*Diplodus sargus*). In holes, we frequently encounter the *red cardinal fish* (*Apogon imerbis*). The males of this specie are easily recognized by their big mouths in which they keep their eggs. Females are usually three to four times more numerous.

The main algae consumers in the Adriatic are urchins and *cow bream* (*Sarpa salpa*) (Image 9). Sea urchins *Arbacia lixula* and *Paracentrotus lividus* are the most common urchins in shallow sea beds. It often happens that the number of urchins is extremely large, so they graze all the algae from the surface to approximately five meters in depth (Image 10). The reasons of such urchin explosion are not completely known, but could be related to the excessive hunting of fish that feed on them, such as the *white seabream* (*Diplodus sargus*). The *spiny starfish* (*Marthasterias glacialis*) also feeds on urchins. The most common starfish among algae is *red starfish* (*Echinaster sepositus*) (Image 11).

A very recognizable and frequent alga of shallow sea bed is *peacock's tail* (*Padina pavonica*) (Image 12). It belongs to brown algae, but is white in color because of calcium carbonate which it incorporates into its body. On the lower side of the body, it has ring-shaped stripes, similar to tree rings. However, this alga is only one year old, so the stripes are not a result of growth, but are places of development for reproductive cells.

Reproduction of some algae can be spectacular. *Green halimeda* (*Halimeda tuna*) (Image 13), is around ten cm long, and is easily recognized because of its disc-shaped segments. This alga reproduces in the summer, and the preparations for
its reproduction are clearly seen two days before releasing its reproductive cells – gametes. In this two-day period, small hair grow on the tip of the segments, and one day before releasing the gametes they expand and fill with gametes, while the rest of the body loses its color (Image 14). Gametes come out from the alga around 45 minutes before sunrise. All the algae reproduce on the same day, releasing gametes at the same time; the sea turns green around these settlements. After releasing gametes, halimedas die, leaving only an empty, white dead body.

Alga *acetabularia* (*Acetabularia acetabulum*) (Image 15) develops during spring and summer. It usually reaches the height of 5 cm, and is formed of one cell. *Sargassum weed* (*Sargassum* spp.) (Image 16) belongs to brown algae and is among the biggest Adriatic algae. Their construction, a with leaf-shaped branches, looks like that of land plants. At the end of some branches they develop small beads, aerocysts, similar to fruit. Aerocysts serve for gathering gases that hold the whole alga in an erect position.

In algae settlements, we can also find fish from the *wrasse family* (*Labridae*) in groups of several tens of organisms (Image 17). The most common species are the *long-snouted wrasse* (*Symphodus rostratus*), the *peacock wrasse* (*Symphodus doderleini*), the *grey wrasse* (*Symphodus cinereus*), the *East Atlantic peacock wrasse* (*Symphodus tinca*) and the *ocellated wrasse* (*Symphodus ocellatus*). They visit algae and hunt for small invertebrates. In spring and summer, the ocellated wrasse male (Image 18) builds a twenty centimeter long nest, in which the female lays her eggs. On the gills, this specie has a big spot in different colors, which is framed by red and blue mottles in males.
Groups of the Mediterranean damselfish (*Chromis chromis*) (Image 19) remain in places of mixing sea currents, or in places where the sea temperature suddenly decreases with an increase in depth. This is where organic particles and planktonic organisms gather – organisms on which Mediterranean damselfish feed. Before reproduction, the male will clean a small hole in a rock and prepare a place to lay eggs. When the female lays eggs during the summer, the male will guard the eggs from hungry fishes. Young Mediterranean damselfish live in shady places. Unlike black grown-ups, the young are turquoise (Image 20). As they grow up, the black color becomes more dominant. However, on adult fish we can see the turquoise color on the fin tops. During the night, when they withdraw in rock holes, the black color is replaced by grey.

Algae settlements are typical places where numerous sponges live. The yellow tube sponge (*Aplysina aerophoba*) is the most recognizable shallow-water sponge (Image 21). Its body is built from ring-shaped bumps that end in an opening through which the sponge ejects filtered sea water after it had taken bacteria and planktonic organisms out for food. In the sea, this sponge is intensively yellow, like sulphur. However, in open air, it goes black very quickly because of pigment oxidation; because of this it is sometimes called the changeable yellow tube sponge. Very often, we can see the sea snail *Tylodina perversa* feeding on this sponge (Image 22).
The sponge *Petrosia ficiformis* is irregularly shaped and light brown or dark purple in color (Image 23). It is common on well lit sea beds, but also on shaded places to 100 meters in depth. This sponge is interesting because of the dotted sea slug (*Peltodoris atromaculata*) which feeds on it (Image 24). It is one of few sea snails that can feed on sponges despite the large amount of skeleton needles, indigestible squamous matter and toxic chemicals that sponges produce. The dotted sea slug is endemic sea snail of the Mediterranean Sea.

Anemones live on well lit places, rarely deeper than ten meters (Image 25). This is because they have a symbiotic microscopic alga in their bodies that needs light for photosynthesis. They color the anemones green-brown color. One anemone can have 200 tentacles, colored purple at the ends. In places with plenty of food, it lives in dense colonies, but more frequently it lives on its own. Among its tentacles, we can often see the fish *bucchichi's gobby* (*Gobius bucchichi*). Small mysid shrimps (*Leptomysis mediterranea*) live just above the anemone (Image 25) because they feel protected near the tentacles. It is not clear what makes Bucchichi’s gobbies and these crabs resistant to anemone's poisonous tentacles.

The fireworm (*Hermodice carunculata*) (Image 26) is a beautiful bristle worm around 20 cm long. It inhabits rocky sea beds, usually from 5 to 20 meters deep. Because of its exquisite color, it is frequently an object of photography. It is more active during the night, when it feeds on dead animals, red anemones, corals and small crabs. When disturbed, it raises its white bristles. **Contact with human skin can cause serious reactions so caution is needed!**
Neptune grass settlements

There are four species of seagrass in the Adriatic Sea. Seagrasses are not algae. They are related to land plants, and they reproduce by flowers and fruit.
Neptune grass (*Posidonia oceanica*) is the most common among seagrasses in the Adriatic Sea (*Image 1*). It is easily differentiated from other grasses by its firm, 1 cm wide stem and dark leaves, approximately 1 meter long. The other three seagrasses (*Cymodoce nodosa*, *Zostera noltii* and *Zostera marina*) are smaller; they have tender light green leaves and do not build spacious meadows like Neptune grass. Among them, the most common is the lesser neptune grass (*Cymodocea nodosa*) (*Image 2*), which grows on shallow sandy and muddy sea beds.

Neptune grass grows from the surface to approximately 30 m in depth, mostly on sandy sea beds, and rarely on rocky ones. Sea transparency is a basic factor for its growth on deeper sea beds. Along the shore, where transparency is reduced, it grows up to 25 m in depth, while along the outer islands, where sea transparency is increased, it can reach 40 m. It consists of a stem attached to the sea bed by roots, and a bunch of ten leaves (*Image 3*). In autumn, it develops a smaller male unsightly flower as well as the usual female flowers (*Image 4*). The flowers are unsightly because they transfer pollen by water, not by using other organisms as vectors hence there is no need for attractive, vivid colors. After pol-
lation, an olive-like fruit is developed (Image 5). In the spring, when the fruit is ripe, it detaches from the branch and floats on the sea surface. After several days, the fruit bursts and releases a seed that sinks to the bed (Image 6). If it reaches a suitable location, it will develop a new plant.

Nevertheless, the growth of Neptune grass is extremely slow. The stem grows at approximately one centimeter per year, and as it grows, it gets covered by the particles falling onto the sea bed. In places with underwater landslides, we can see stems several meters long, buried in the sediment. The part growing outside the sediment is merely ten centimeters long and usually carries only one bunch of leaves. These plants were conceived several hundreds years ago! Neptune grass is the longest living Mediterranean organism, and some Neptune grass settlements were probably developed even before Croats settled the sea area (in the 7th century)! Due to its slow growth, even the slightest destruction of Neptune grass is almost an irreversible process during a human lifetime.

*Posidonia oceanica* lives only in the Mediterranean Sea (it is an endemic Mediterranean species). It is believed that it covers around 25% of sea bed to 40 meters in depth. Its settlements are the areas of largest biological diversity in the Mediterranean Sea. Though it may come as a surprise, just a slightly detailed insight into its settlements will lead us into a world of an amazing biological diversity. Most organisms are very small (a centimeter or a millimeter), many of which are even microscopic (Image 7).
Image 7. Organisms on the leaves of the Neptune grass (a) diatom – 0.1 mm, (b) isopod shrimp – 1 mm, (c) bristle worm – 10 mm, (d) sea slug – 1.5 cm, (e) red filamentous alga – 2 cm, (f) colony of moss animals Electra posidoniae – 3 cm
On every Neptune grass leaf we can find over thirty species of algae. Moreover, experts have recorded as many as 220 species within some settlements. The amount of algae and immobile animals is especially visible on older leaves near the end of summer (Image 8). In the autumn, old leaves fall out, leaving only younger ones that are not so overgrown. As for the animals, moss animals often live on the leaves of Neptune grass. They are community animals that build different-shaped calcified colonies. One of the most common moss animals is *Electra posidoniae* (Image 7f).

Given that leaves live approximately one year, permanently attached organisms must also end their life cycle within that time.

Unlike organisms on the leaves, organisms attached to the stem can live until buried by the sediment. Here we can also find numerous algae species, especially red algae that require less light (Image 9). Beside them, common organisms are sponges, moss animals and bristle worms. The life lurking among the leaves of Neptune grass often surprises divers with its incredible abundance of organisms living within the meadow.

Bivalves and snails can live on the leaves, on the stem or buried in the sediment. In Neptune grass settlements, 185 species of bivalves and snails have been recorded. Among bivalves, the most famous is *noble pen shell* (*Pinna nobilis*) (Image 2), which is our biggest bivalve. It can sometimes grow tiny irregular pearls. The *tun snail* (*Tonna galea*) (Image 10), one of the biggest Mediterranean snails, can also live here. It lays eggs in a strap-shaped gelatin substance, so called a “cocoon”, which is over a meter long and ten centimeters wide. Thousands of tiny planktonic snails develop within it.

Among the largest slug snails is the *sea-hare* (*Aplysia depilans*), which can grow up to twenty centimeters (Image 11). It has a rudimentary shell, and in the case of danger it releases purple ink. It can swim graciously by waving its cape. It is herbivore and feeds on algae and seagrass.

In Neptune grass meadows, over 120 species of crabs have been found. Most of them are small, with almost microscopic dimensions. However, we can encounter large crabs, such as the *spider crab* (*Maja squinado*).
Sea cucumbers are also numerous in the Neptune grass. They swallow the sediment and extract organic matter, purifying the sediment and making it softer.

Sea squirts are unusually shaped organisms (Image 12). However, they are evolutionally more closely related to humans than to any invertebrate. The relation can be seen in the early development phases, when they had a primitive spine–like organ, an evolutional ancestor of the spinal cord. They appear in different shapes, and can live individually or in colonies. Their common features are two openings. One serves to inhale the sea, organic particles and plankton for food, and the other to eject filtered sea and their refuse.

In total, over 50 fish species have been recorded in Neptune grass settlements. Above the settlement, the bogue fish (Boops boops) and pickerel (Spicara spp.) live in dense groups. They are food for the European barracuda (Sphyraena sphyraena) – Mediterranean barracuda that can reach up to 1,2 m in length (usually 30 to 50 cm) and 6 kg in weight (Image 13). Young greater amberjacks (Seriola dumerili) (Image 14) also circle here. Directly above the leaves, we can often see Mediterranean rainbow wrasse (Coris julis) and black-tailed wrasse (Symphodus melanocercus) – a small fish specialized for cleaning other fish from parasites. In the Neptune grass, we can also encounter some rare fish species, like the brown meagre (Sciaena umbra), the brown wrasse (Labrus merula) and the trush (Labrus viridis). These beautiful species are nowadays endangered due to excessive hunting by underwater spear fishers.
Night diving above the Neptune grass can be an unforgettable experience. Thousands of bristle worms and planktonic crabs gather around diving lamps. Fish appear to be sleeping, and many species become colored in fantastic colors invisible in the daytime, such as the John Dory (Zeus faber) (Image 15). An encounter with red anemone Alicia mirabilis can be especially surprising. During the day, it holds in its tentacles and resembles a hamburger, and during the night it spreads its several tens of centimeters long tentacles (Image 16). Certain information suggests that these tentacles can severely burn skin!

Because of the ecological and biological value and vulnerability, Neptune grass settlements were proclaimed priority habitat in Croatia and European Union, and Neptune grass itself is protected by the law.

Start researching the biologically most diverse habitat in the Mediterranean Sea. The life lurking in the thick, shallow settlements will certainly surprise you!

**Caution:** Using gloves is recommended while exploring Neptune grass because of numerous cnidarians and echinoderms.

### The importance of Neptune grass settlements

- oxygen production (“the lungs of the Mediterranean”) and organic matter production
- habitat, nursery and feeding area for many fishes, crabs and cephalopods
- leaves and stems increase the surface for settlement of animals and algae
- Neptune grass leaves capture sea particles and make it more transparent
- dense settlement reduce the wave strength and thus protect the shore from erosion
- fallen leaves in the autumn and winter protect sand shores from erosion
- significantly incorporates carbon into the sediment
- it is an indicator of clean sea
Detritic sea beds

On sediment sea beds between 30 and 120 m in depth, near the land and islands, develops a biologically rich community.
The sediment here is not only made of sand and mud, which is the result of rock abrasion on land, but is also made of the remains of the organisms living there. Mostly these are moss animals, sea snails, bivalves, and calcified red algae. The biogenic part of the sediment is called detritus, and this type of sea bed is called the detritic sea bed (Image 1).

Red algae, which incorporate calcium carbonate into its tissue, can often have an important role in forming this kind of sea bed. In certain places, detritic sea bed is extremely rich in life. Tender and fragile moss animals that sometimes completely cover the sea bed are impressive (Image 2). Numerous crinoids, Mediterranean feather stars (Antedon mediterranea) (Image 3), are often seen in groups consisting of several tens of organisms. The Mediterranean feather star has 5 tentacles that branch at the beginning, which makes an illusion of 10 tentacles. Many branches on the tentacles are similar to feathers, hence the name.

Community bristle worms Filograna spp. (Image 4) make 10 cm wide communities. Every organism builds a white chalky tube, in which we can find half a centimeter long bristle worm that feeds by filtering the seawater.
These bristle worms are frequently found in coralligen as well.
When it comes to fishes, there are numerous striped mullets (*Mullus surmuletus*) (Image 5), that dig the sediment, seeking tiny invertebrates. Tens of them can be seen lying on the bed and are always a good photographic object.

The unusual starfish *Peltaster placenta* is also very frequent (Image 6). This species lives in the Mediterranean Sea and the Atlantic Ocean, between 10 and 500 m in depth. It is interesting that this starfish is one of the few species that has entered the Red Sea from the Mediterranean through the Suez Channel.

When the sea snail *Astrea rugosa* (Image 7) places its small body in its shell, it closes the shell with a top cover (operculum), which is red on the inside and white on the outside. In Italy, this operculum is called “St. Lucia's eye”, and is a traditional amulet that brings luck and is used to make jewelry. The operculum is frequently found on detritic beds (Image 8).
Coralligen

The name coralligen comes from French word coralligène, which was first used in 1883 by an explorer to describe the sea bed near Marseille at 30 to 70 m depth.
Coralligène means coral producer, and the name refers to a red coral developed on a rocky sea bed. If we dive deeper than twenty meters, on the vertical rocky bed we encounter the **coralligenous biocenosis** (Image 1). The main condition for the development of coralligen is light, which has to be low enough to prevent the development of light-loving algae, but enable the growth of shade-loving species, i.e. the ones living in areas with little light. Due to this, in transparent seas, coralligen develops in deeper regions, and in less transparent seas it develops in shallower water. Coralligen can also appear on very shallow sea beds, even in clear sea if the light is low enough, such as environments like entrances to sea caves. In transparent seas, it can develop to up to 120 m in depth – this is the maximum depth where shade-loving algae can live.

Coralligen is a unique, endemic Mediterranean biocenosis built by algae and animals. Depending on rock slope and ecological conditions (such as sea currents, sedimentation, temperature or salinity), coralligenous biocenosis will be composed of different organisms. The base of coralligen are the red algae family **Corallinaceae**, which incorporate calcium carbonate into their bodies (Image 2). They create biogenic clusters which are a base for the growth of other organisms. These algae can sometimes build complex layered pink-purple structures, very attractive for photography.

Even though they are not coralligenous algae, in some areas species of genus **Peysonnelia** can be the dominant algae that build a very fungous coralligen (Image 3).
After the Neptune grass settlement, this habitat has the second highest number of species in the Mediterranean Sea. Some scientists believe that the number of organisms is greater than in Neptune grass settlements, and that the values are still underestimated because of difficulties related to data collection, associated with great depths in which the coralligen develops. The large number of species is one of the things that enchants divers in coralligenous biocenosis – the primarily species are sponges, gorgonians, molluscs, moss animals, sea squirts, crabs and fishes. In addition there are many more organisms which can not be seen during diving, because of their size or their cryptic way of life hidden inside the red algae bioincrustation. In one sample, within less than half a kilogram of coralligenous algae, over 1000 samples of small crabs, molluscs and bristle worms were counted. It is estimated that in coralligenous biocenosis there are approximately 1250 species of invertebrates, 315 species of macroalgae, as well as between 110 and 125 species of fishes found in the coralligenous biocoenosis. The total number of species is estimated to approximately 1660.

In the Adriatic Sea, coralligen consists of large moss animals, gorgonians and sponges (Image 4). Red coral (Corallium rubrum), has become extremely rare on depths to forty meters, due to excessive collection. It is more likely that divers will encounter yellow cluster anemone (Parazoanthus axinellae) or lonely sunset cup coral (Leptopsammia pruvoti) (Image 5), especially on partially shaded rocky sea beds in cave entrances and notches.

Sessile coralligenous organisms grow extremely slowly. It is especially visible in algae, which in great depths have little light necessary for growth. It is estimated that basic coralligenous algae species grow around one to three millimeters per year. Coralligenous algae probably do not grow at all in depths greater than 50 meters, or their growth is minuscule. It is considered that, in those depths, biogenic algae constructions were made 7000 – 8500 years ago, when the sea was shallower and the algae had enough light for growth.

Gorgonians grow approximately 2 cm per year. It is estimated that a 55 cm tall red gorgonian (Paramuricea clavata) (Image 6) is around thirty years old. Red gorgonian begins its reproduction only after it reaches the age of ten years.

Red finger (Alcyonium acaule) (Image 7) grows so slowly that no growth can be noted in two years! It is the same with many colonial sea squirts and sponges.
Due to the slow growth of basic coralligen builders, every destruction is almost irreversible.

Recognition of basic coralligenous species of algae, sponges and sea squirts is extremely difficult and can only be possible sometimes in laboratory conditions. Sport divers often miss algae in coralligen, but are attracted by larger sessile animals such as gorgonians and mobile animals—primarily fishes, crabs and echinoderms.

An underwater lamp is necessary in order to see colors in the depths that this biocenosis is found. Not until we turn on the lamp do we realize that red gorgonian \((\text{Paramuricea clavata})\) isn't blue but dark red!

**Gorgonians** are colonial corals that build branched colonies similar to trees. In coralligen, we mostly find the **yellow gorgonian** \((\text{Eunicella cavolini})\) (**Image 8**) and the **red gorgonian** \((\text{Paramuricea clavata})\) (**Image 6**), and rarely the **white gorgonian** \((\text{Eunicella singularis})\). Tiny polyps building the colony hunt for planktonic organisms with their tentacles. Gorgonians develop especially well on places with strong sea currents, because currents bring planktonic organisms and oxygen-rich water.

**Moss animals**, such as the species \(\text{Pentapora fascialis} \quad \text{(Image 9)}\) are very important coralligen builders. They are colonial organisms that grow branched colonies to approximately ten cm high. Some organisms in the colony are very small and specialized for tasks such as defense, feeding or reproduction.

The **spiny lobster** \((\text{Palinurus elephas})\) is frequently found in coralligen **(Image 10)**. It is easily recognized because of its long antennae and small pincers. It can reach up to 50 cm in length. It is active during the night, when it feeds on invertebrates and dead organisms. In coralligen we can also encounter the **Mediterranean slipper lobster** \((\text{Scyllarides latus})\) and the **lesser slipper lobster** \((\text{Scyllarides arctus})\), that also have small pincers. One of the most frequently found crabs is the **squat lobster** \((\text{Galathea strigosa}) \quad \text{(Image 11)}\), which can be recognized by blue stripes around the eyes. The **golden coral shrimp** \((\text{Stenopus spinosus}) \quad \text{(Image 12)}\) has three pairs of very long antennae. This shrimp, as well as squat lobster, is usually seen during night dives.

Among the fishes inhabiting holes in coralligen is the **swallowtail seaperch**
(Anthias anthias) (Image 13). It usually lives in smaller groups. All the fish in a group are female, except for the biggest one, which is male. When the male dies, it is replaced by the biggest female, which then changes sex.

**Red scorpionfish** (*Scorpaena scrofa*) (Image 14) is a convenient photo object. It blends with the coralligenous bed due to its color. The biggest red scorpionfish can be over 15 years old. The **cuckoo wrasse** (*Labrus bimaculatus*) (Image 15) often lives in a pair. Females are orange and have 2 – 3 black spots on their back, interspersed with white dots. In the spring, the reproduction period, males have a beautiful wedding gown. They then build a nest from algae, in which the female lays her eggs. Cuckoo wrasse can live to over 17 years.

**Due to its biological value and sensitivity,** the European Union and Croatia have included coralligen in endangered and rare habitats.
Sea caves

Due to the porous limestone of our coast, sea caves are very frequent. The majority were probably created several thousand years ago, when sea level was lower than today.
Fresh water dissolves the limestone and creates caves and cave decorations. When sea level rose, land caves made by fresh water activity became sea caves. In some of them, we can still find the remains of cave features, such as stalagmites and stalactites.

The lack of light is the main feature of caves and it determines which organisms live there (Image 1). Entering the cave, we can see that the number of algae decreases – the deepest are red calcified species and crusty green alga *Palmophyllum crassum* (Image 2).
When it comes to invertebrates, most frequent are **cnidarians** (Image 3), **moss animals** (Images 3 and 4) and **sponges** (Images 1, 5 and 7). Mobile animals include planktonic crabs, **golden coral shrimp** (*Stenopus spinosus*), fish **leopard spotted goby** (*Thorogobius ephippiatus*) (Image 6) and **cardinal fish** (*Apogon imberbis*) (Image 7).

Light does not reach the deeper areas of the cave and, due to minimal sea currents, the food inflow is low. Consequently, a rich diversity of sea organisms is not possible, so such deeper cave areas are mostly inhabited by sponges and bristle worms (Image 8). Due to the low concentration of plankton and particles in sea water, cave water is often extremely clear.
Diving locations

Foto: Stjepan Šaškor
In the Šibenik – Knin County, there are many more diving localities than the 47 shown here. These localities are only a small part, chosen to excite your imagination and your desire for a unique diving experience. Shallow sea beds contain colorful algae and meadows of sea-grass; in deeper seas gorgonian forests host numerous interesting species; shipwrecks abound with fish and sponges; in some places the river Krka brings plenty of food for unusual filtrating organisms. In places with crystal-clear open sea there is the impression of infinite blueness.
The River Krka (lower course)

Legend:

- Šibenik – Knin County
- National park
- Significant landscape
- National ecological network 1–18 (see pg. 17)
- Diving locations 1–47
- Diving centres (see pg. 122)
1. **Babuljaš Veliki**

COORDINATES: 43°52'27"N 15°21'13"E

A small island situated northeast from the island of Žut. Anchoring is usually done on the southern side. As we descend gently southward over the rocky sea bed, we reach a red gorgonian settlement that grows from 20m to 45 m in depth. Between these settlements, there are numerous holes and caves abounding in coralligenous organisms.

**HABITATS:** light-loving algae, coralligen, smaller sea caves, detritic bed (deeper than 45 m)

**LOCATION’S SPECIFICITY:** red gorgonian settlement between 20 and 45 m.

**DEPTH:** to 45 m

**SUBMERSION DIFFICULTY:** medium (suitable for beginners with escort and advanced divers).

**PHOTOGRAPHS:** Red gorgonian Paramuricea clavata. Photo: Cro-Pro-Scuba. Mediterranean moray Muraena helena. Photo: Cro-Pro-Scuba. Squat lobster Galathea strigosa. Photo: Cro-Pro-Scuba.
2.

Babuljaš Mali

COORDINATES: 43°52′39″N 15°20′58″E

A small island situated northeast from the island of Žut. If the weather is good, anchoring is possible on the northern side of the island. Diving northwards is recommended for experienced divers, where they can reach a rich red gorgonian settlement. Less experienced divers start from the anchoring location north-west, where, at the depth of 20 m, they reach a smaller red gorgonian settlement.

HABITATS: light-loving algae, Neptune grass settlement, coralligen, smaller sea caves, detritic bed (deeper that 40 m).
LOCATION’S SPECIFICITY: a rich red gorgonian settlement.
DEPTH: to 40 m.
SUBMERSION DIFFICULTY: medium (suitable for beginners with escort and advanced divers).
Reef Miši

COORDINATES: 43°52’42”N 15°21’30”E

South from the island of Žut there is an underwater reef that almost reaches the surface. Beware of ships! In south-eastern direction there is an underwater wall. Diving next to it, we reach parts of an unknown wreck, under which there is an interesting animal world. Deeper than 35 m, there is a rocky sea bed inhabited by red gorgonians.

HABITATS: light-loving algae, coralligen
LOCATION'S SPECIFICITY: shipwreck and red gorgonians
DEPTH: from 2 to 40 m.
SUBMERSION DIFFICULTY: wreck suitable for all categories; gorgonians suitable for experienced divers.
PHOTOGRAPHS: Shipwreck Misi. Photo: Najada. Bivalve Pteria hirundo on a red gorgonian. Dotted sea slug Discodoris atromaculata. Photo: Cro-Pro-Scuba
The island of Borovnik is situated in the northeast part of national park Kornati and is exposed to the open sea. Anchoring is possible in the passage between the islands of Borovnik and Balun, or in a small cove on the south-western side of the island. There is a coralligenous wall with red gorgonians and three smaller sea caves. Throughout the entire area there are plenty of fish.

**Habitats:** light-loving algae, coralligen, sea caves  
**Location’s Specificity:** red gorgonian settlement, frequent large fish schools. Site is within the area of national park Kornati.  
**Depth:** to 60 m.  
**Submersion Difficulty:** suitable for experienced divers  
**Photographs:** Eastern side of the island of Borovnik. Starfish *Peltaster placenta* Sunset cup coral *Leptopsammia pruvoti* and yellow gorgonian *Eunicella cavolini*
Mana

COORDINATES: 43°48’00”N 15°15’43”E

The island of Mana is situated on the south-western part of national park Kornati. Anchoring is possible in north-western cove, from which we swim over a Neptune grass settlement approximately 150 m to the wall edge. Diving is done along the coralligenous wall with red gorgonians. At the end of the wall, 60 m deep, there are remains of a small wooden ship that in the 50s served for making the movie the “Wild Sea”. There is plenty of fish, and it is possible to see groups of common dentex. On the way out, we visit a small cave with a chimney.

HABITATS: light-loving algae, coralligen, Neptune grass settlement, sea cave, detritic bed (deeper than 60 m).
LOCATION’S SPECIFICITY: diverse and rich flora and fauna. Site is within the area of NP Kornati.
DEPTH: to 60 m.
SUBMERSION DIFFICULTY: suitable for experienced divers.
6. Veli Rašip
COORDINATES: 43°46′43″N 15°18′34″E

The island of Veli Rašip is situated in the middle part of NP Kornati and is exposed to the open sea. Anchoring is done on the north-western or south-eastern part of the island, from where diving starts along a steep coralligenous wall. The wall is overgrown by red gorgonians and is full of holes, where we can see Mediterranean moray and scorpionfish.

HABITATS: light-loving algae, coralligen, Neptune grass settlement, detritic bed (deeper than 60 m)
LOCATION’S SPECIFICITY: diversity of species. Site is within the area of NP Kornati.
DEPTH: to 60 m
SUBMERSION DIFFICULTY: suitable for experienced divers
PHOTOGRAPHS: Light-loving algae and seagrass *Posidonia oceanica*. Red gorgonian *Paramuricea clavata*. Photo: Petar Kružić
Mala Panitula

COORDINATES: 43°45’19”N 15°21’05”E

The island is situated in the middle of the southern part of NP Kornati and is exposed to the open sea. Anchoring is made between the islands of Velika Panitula and Mala Panitula. We dive along a vertical wall, which is full of holes and covered in red gorgonians. We almost always meet spiny and common lobsters here.

HABITATS: light-loving algae, coralligen, Neptune grass settlement, detritic bed (deeper than 60 m).
LOCATION’S SPECIFICITY: coralligenous wall. Site is within the area of NP Kornati.
DEPTH: to 60 m
SUBMERSION DIFFICULTY: suitable for experienced divers.
The island is situated in the middle of the southern part of NP Kornati and is exposed to the open sea. Anchoring is made between the islands of Velika Panitula and Mala Panitula. We dive along a wall which drops steeply to 60 m. The wall is rich in coralligenous organisms, especially red gorgonians, and one can almost always see morays and spiny and common lobsters in holes and little caves.

**HABITATS:** light-loving algae, coralligen, Neptune grass settlement, detritic bed (deeper than 60 m).

**LOCATION'S SPECIFICITY:** very rich flora and fauna. Site is within the area of NP Kornati.

**DEPTH:** to 60 m.

**SUBMERSION DIFFICULTY:** suitable for experienced divers.

The island of Kasela is situated in the middle of the southern part of NP Kornati and is exposed to the open sea. Anchoring is made in the passage between the islands of Kasela and Klobučar. Underwater wall is specific because of the presence of deep vertical ravines. Coralligen is rich with organisms such as red gorgonians. Mediterranean moray, spiny and common lobsters live in its holes. We can often find catshark’s eggs on gorgonians.

**HABITATS:** light-loving algae, coralligen, Neptune grass settlement.

**LOCATION'S SPECIFICITY:** extremely rich coralligenous community. Site is within the area of NP Kornati.

**DEPTH:** to 60 m.

**SUBMERSION DIFFICULTY:** suitable for experienced divers.

**PHOTOGRAPHS:** Islands on the southern side of NP Kornati. Catshark’s eggs. Photo: Cro-Pro-Scuba. Bristle worm *Hermodice carunculata* on yellow gorgonian *Eunicella cavolini*. Photo: Cro-Pro-Scuba.
10. **Opat (Tanka prisliga)**

**COORDINATES:** 43°44'26"N 15°27'41"E

This site is situated on the north-eastern side of the island of Kornat. Anchoring is made on the north-eastern side of the island, in the first cove from Opat. Diving is over a Neptune grass settlement leading to a coralligenous wall, on which we meet spiny and common lobsters. Common fish are two-banded bream, sharpsnout seabream and common dentex. There are several sea caves – the biggest one is around 15 m deep and situated at the depth of 50 m.

**HABITATS:** light-loving algae, coralligen, sea caves, Neptune grass.

**LOCATION'S SPECIFICITY:** coralligen and sea caves. Site is within the area of NP Kornati.

**DEPTH:** to 55 m.

**SUBLIMATION DIFFICULTY:** suitable for experienced divers.

**PHOTOGRAPHS:** Yellow gorgonian *Eunicella cavolini*. Transfer from land to the sea. Sponges *Spirastrella* sp. in a coralligenous community.
Samograd

COORDINATES: 43°41’12”N 15°33’21”E

Samograd is an island situated on the south-eastern edge of NP Kornati and is exposed to the open sea. Diving is done along a coralligenous wall with impressively developed red gorgonian settlement. Many other organisms also live here – we nearly always meet spiny lobsters.

HABITATS: light-loving algae, coralligen.
LOCATION'S SPECIFICITY: a rich red gorgonian settlement.

Site is within the area of NP Kornati.

DEPTH: to 50 m.

SUBMERSION DIFFICULTY: suitable for experienced divers.

PHOTOGRAPHS: Coralligenous sponge Haliclona mediterranea. Photo: Cro- Pro-Scuba. Community bristle worms Filograna sp. on a sponge Axinella sp. Green alga Codium sp.
Sika od Kamenara

COORDINATES: 43°49'04”N 15°22’50”E

Underwater reef beginning at a depth of 5 m, situated on the south-eastern side of the island of Žut. The reef falls gently eastward to 15 m in depth, and then develops into a steep horseshoe-shaped wall, which continues to deeper than 50 m. At 30 m, the wall becomes inhabited by yellow gorgonians. Red gorgonians are less frequent.

HABITATS: light-loving algae, coralligen, detritic bed.
LOCATION’S SPECIFICITY: a yellow gorgonian settlement at about 30 m.
DEPTH: 5 to over 50 m.
SUBMERSION DIFFICULTY: medium (suitable for beginners with escort and advanced divers).
PHOTOGRAPHS: Žut – Sit island group. Hidroids on a yellow gorgonian. Yellow gorgonian *Eunicella cavolini*. 
Rock Mišine

COORDINATES: 43°48’44”N 15°33’53”E

A small rock, recognizable by its red lighthouse, situated southwest from the island of Murter. Anchoring is possible on the southern and south-eastern side of the rock. On the western side, there is a wall beginning at 3 m and stretching northward, to approximately 40 m in depth.

HABITATS: light-loving algae, Neptune grass settlement, coralligen (relatively poor), detritic bed (deeper than 40 m).

LOCATION’S SPECIFICITY: easy and relaxed diving.

DEPTH: to 40 m.

SUBMERSION DIFFICULTY: easy (suitable for beginners and advanced divers).

A small rock, famous for its lighthouse, situated near the island of Kukuljar, opposite St. Nikola cove on the island of Murter. It is one of the most popular diving locations. On the western side, between 10 and 25 meters, there is a rich Neptune grass settlement, and on the eastern side there are two walls. One falls step-like from the surface to approximately 25 m above a sandy sea bed. The other wall falls to 37 m in depth, where the sandy sea bed begins. Both walls are inhabited by yellow gorgonians.

**HABITATS:** light-loving algae, Neptune grass settlement, coralligen, sea caves, detritic bed (deeper than 25 m).

**LOCATION’S SPECIFICITY:** two shallow walls.

**DEPTH:** to 40 m.

**SUBMERSION DIFFICULTY:** easy, suitable for beginners and advanced divers.

**PHOTOGRAPHS:** Kukuljar islands. Scorpionfish *Scorpaena notata*. Photo: Cro-Pro-Scuba. Sponges, cnidarians and moss animals in coralligen. Photo: Cro-Pro-Scuba.
The underwater reef begins at the depth of around 6 m, situated northwest from the island of Čavlin. The anchoring location is on the top of the reef. In this position, weather conditions must be suitable for diving (no waves or wind). On the north-western side of the reef, there is a wall beginning at 15 m and falling northward, to 48 m in depth. The wall abounds in holes and small caves. One smaller cave is situated at 30 m in depth. Coralligen community is poorly developed.

**HABITATS:** light-loving algae, coralligen (poorly developed), sea caves, detritic bed (deeper than 48 m).

**LOCATION’S SPECIFICITY:** underwater cliff.

**DEPTH:** 6 – 50 m.

**SUBMERSION DIFFICULTY:** medium, suitable for experienced divers.

**PHOTOGRAPHS:** Bottlenose dolphins *Tursiops truncatus*. Red carbonate alga *Amphiroa rigida*. Seagrass *Posidonia oceanica*. 
Reef Kablinac

coordinates: 43°42′56″N 15°36′29″E

An underwater reef situated west from the island of Mali tetovišnjak. Anchoring is possible around the entire reef. On the eastern and north-eastern side there is a rich Neptune grass settlement. If we dive on the western side southward, we dive above a Neptune grass settlement and reach a wall beginning at approximately 28 m and falling to approximately 60 m in depth. The wall stretches in south – north direction and abounds in red and yellow gorgonians. There are many holes and small caves in which we can see spiny lobsters.

HABITATS: light-loving algae, Neptune grass settlement, coralligen, smaller sea caves, detritic bed (deeper than 37 m).

LOCATION’S SPECIFICITY: coralligen, habitat diversity.

DEPTH: 5 – 55 m.

SUBMERSION DIFFICULTY: medium, not suitable for beginners.

Reef Male Mare

COORDINATES: 43°42’48”N 15°38’03”E

A reef situated on the north-eastern side of the island of Kakan, at the depth of 5 m. It is recognizable by a red lighthouse. Anchoring is possible around the entire reef. If diving is done on the north-western side, divers reach a short wall, beginning at 15 m and falling to 50 m in depth. Near the end of the wall, there is a small cave in which spiny and common lobsters can be seen.

HABITATS: light-loving algae, sea caves, coralligen (poorly developed), detritic bed.
LOCATION’S SPECIFICITY: shallow underwater cliff with a deep wall.
DEPTH: 5 – 55 m.
SUBMERSION DIFFICULTY: medium.
18. Cape Kaprije
COORDINATES: 43°43’10”N 15°40’22”E

A cape situated on the north-western side of the island of Kaprije. It is a popular diving position. If weather conditions are suitable, anchoring is recommended on the cape itself. We dive north-westward. At the depth of 15 m, we reach a wall that lowers to 25 m in depth. The wall has a hole with numerous smaller caves and holes. Continuing on there is another wall falling to 45 m.

HABITATS: light-loving algae, coralligen, smaller sea caves, detritic bed (deeper than 45 m).
LOCATION’S SPECIFICITY: a position rich in smaller caves and yellow gorgonians.
DEPTH: to 45 m.
SUBMERSION DIFFICULTY: medium, suitable for beginners and advanced divers.
PHOTOGRAPHS: Sea slug *Thuridilla hopei*. Golden coral shrimp *Stenopus spinosus*. Green alga *Codium bursa*. 
Although in Murter there are still people who saw the sinking of German ship Francesca da Rimini on March 22nd 1944, there is little information on this ship. According to reports, two English *spitfire* airplanes found Francesca anchored in front of the island of Kapri and hit it with a torpedo. The ship had been transporting munitions for troops in Africa, and had anchored due to a broken engine. Francesca is 42 m long, 12 m wide and excellently preserved. The upper deck is 38 m high, and the keel 50 m high. The ship is overgrown by sponges and rich in fishes like conger eel and common dentex. This is one of the most interesting wrecks in this part of the Adriatic Sea.

**LOCATION’S SPECIFICITY:** one of the most attractive ship-wrecks in the Adriatic Sea.

**DEPTH:** 40 – 50 m

**SUBMERSION DIFFICULTY:** suitable for experienced divers. Diving is only possible for diving centers with permission.

The rock is situated approximately 2 nautical miles northwest from the island of Žirje. It is possible to dive from two starting position. On the south-western side there is a rich wall overgrown by rare yellow gorgonians, stretching southward to 65 meters in depth. On the north-western side of the rock, we find parts of a sunken fishing boat lying on a sandy sea bed at approximately 40 m.

**Habitats:** light-loving algae, coralligen, smaller sea caves, detritic bed (deeper than 40 m).  
**Location’s Specificity:** fishing boat wreck  
**Depth:** to 65 m.  
**Submersion Difficulty:** exclusively for experienced divers.  
**Photographs:** Jellyfish *Pelagia noctiluca*. Mediterranean damselfish *Chromis chromis*. Photo: Petar Kružić. Red alga *Peyssonnelia* sp.
The underwater reef is situated on the north-western side of the island of Žirje, at the depth of 2 m. The locality is suitable for all kinds of divers. Less experienced ones can dive at smaller depths around the entire reef, where they can see remains of amphorae and other ceramic objects. For the more experienced, diving north-westward is recommended, because there is a richly overgrown wall. The wall stretches northward, where, at 20 m, divers can find remains of ceramic objects.

HABITATS: light-loving algae, Neptune grass settlement, coralligen, smaller sea caves, detritic bed (deeper than 50 m).
LOCATION’S SPECIFICITY: shallow underwater reef, archaeological remains and a wall.
DEPTH: 2 – 50 m
SUBMERSION DIFFICULTY: medium, with caution because of strong sea currents.
An underwater rock with the minimum depth of 3 m. The optimal diving direction is north-westward, where a wall with gorgonians falls to 50 m. In the shallow part, the landscape is interesting because of unusually shaped rocks. While diving, one passes near two older anchors: one at 35 m, and the other at 18 m.

**HABITATS:** light-loving algae, coralligen, sea caves, detritic bed (deeper than 50 m).

**LOCATION’S SPECIFICITY:** underwater rock, wall with gorgonians, old anchors.

**DEPTH:** 3 – 60 m.

**SUBMERSION DIFFICULTY:** exclusively for experienced divers.

**PHOTOGRAPHS:** John Dory *Zeus faber*. Photo: Cro-Pro-Scuba. Old anchors. Photo: Najada.
Blitvenica

COORDINATES: 43°37’29”N 15°34’29”E

An attractive diving location situated 3 nautical miles south from the island of Žirje. It is easily noticeable because of the lighthouse which is considered to be the most exposed of the Šibenik archipelago. If the weather conditions allow, anchoring is best on the eastern side, where a wall begins at 18 m and ends deeper than 60 m. The wall is abundantly overgrown by gorgonians and coralligenous biocoenosis organisms.

HABITATS: light-loving algae, coralligen, smaller sea caves, detritic bed (deeper than 60 m).
LOCATION’S SPECIFICITY: extremely rich coralligen.
DEPTH: to 60 m.
SUBMERSION DIFFICULTY: exclusively for experienced divers.
24. **Shallows Grmeni**

**COORDINATES:** 43°36’24”N 15°37’48”E

A shallows area situated 2 nautical miles northeast from the island of Blitvenica, at the depth of 5 m. The locality is an extremely popular diving destination. The underwater wall begins at 16 m, stretching to approximately 60 m. On the sea bed, there is an unknown shipwreck. The wall is rich in red and yellow gorgonians, and among the red ones there are even two-colored gorgonians. Numerous holes and caves are densely overgrown by coralligenous organisms.

**HABITATS:** light-loving algae, smaller Neptune grass settlements, coralligen, smaller sea caves, detritic bed (deeper than 60 m).

**LOCATION’S SPECIFICITY:** a rich red and yellow gorgonian settlement, shipwreck.

**DEPTH:** 5 – 60 m.

**SUBMERSION DIFFICULTY:** medium; beginners can dive at the wall top to 20 m deep with escort.

**PHOTOGRAPHS:** Polyps in red gorgonian *Paramuricea lavata*. Catshark’s eggs. Coralligenous biocenosis.
The small island of Bakul is situated west from the island of Žirje. Almost all sea bed organisms of the eastern Adriatic shore can be seen here, including red coral at greater depths. Anchoring is made off the south-western side and diving begins westward. At the depth of 18 m begins a beautiful, almost vertical wall, stretching to 98 m. The most beautiful part of the position is at 35 m, where a big rock lies parallel to the wall, making an underwater passage 15 m long and 5 m wide – enough for a pair of divers. While diving, divers meet spiny and common lobsters, moray and red scorpionfish in coralligen, and octopuses and large groups of damselfish in shallow water.

**HABITATS:** light-loving algae, coralligen.

**LOCATION’S SPECIFICITY:** extremely rich in organisms.

**DEPTH:** to 100 m.

**SUBMERSION DIFFICULTY:** suitable for advanced divers and technical diving.

The island of Sokol

COORDINATES: 43°39’45”N 15°47’13”E

The whole island is very interesting for diving, except for its north-eastern part, which becomes a Neptune grass settlement after only 5 – 6 m. It is best to start diving on the southern part, which drops steeply to the depth of 40 m. There is a wall, abundantly inhabited by yellow gorgonians. In the sea bed, there are several holes and ravines, where we meet lobsters, two-banded breams and red scorpionfish. The north-western side of the island is very steep and falls to the depth of 12 m. A shallow vertical wall, going down to 45 m, is filled with life typical for coralligenous biocoenosis, such as coralligenous algae, yellow gorgonians, lobsters, scorpionfish. On the shallow part, one often meets octopuses.

HABITATS: light-loving algae, Neptune grass settlement, coralligen, detritic bed (deeper than 40 – 45 m).

LOCATION’S SPECIFICITY: species and habitat diversity.

DEPTH: to 45 m.

SUBMERSION DIFFICULTY: suitable for all diving categories.

An underwater reef with a minimal depth of 4 m. It is best to attach to a concrete sign that marks the shallow part. The most interesting is the south-western part, which drops steeply to 25 m, where it continues as a wall to 33 m. At this depth, there are several smaller holes and ravines that are habitats for scorpionfish, lobsters, larger forkbeards and two-banded breams. The western part is more horizontal. After ten meters, the rocky sea bed with algae becomes a Neptune grass settlement. The shallower part around the concrete sign is interesting for beginners because of abundant plant and animal world – especially fish, among which we can find barracudas. In the Sestrice area we can often meet dolphins.

**HABITATS:** light-loving algae, Neptune grass settlement, coralligen, detritic bed (deeper than 33 m).

**LOCATION’S SPECIFICITY:** underwater reef, position rich in fish.

**DEPTH:** 4 – 40 m.

**SUBMERSION DIFFICULTY:** suitable for all diving categories – avoid diving in case of stronger currents.

**PHOTOGRAPHS:** A group of damselfish *Chromis chromis* and blotched picarel *Spicara maena*. Bottlenose dolphins *Tursiops truncatus*. Tompot blenny *Parablennius gattorugine*. 
The Borak shipwreck is situated near Šibenik channel, where salty and fresh water from the river Krka mix. The ship sunk in 1998 while transporting cement. Today, Borak lies at 60 – 65 m. While diving in ship’s embarkation area, we can still find cement packages. The ship makes an unforgettable impression because of its dimensions: 60 m in length and 10 m in width. The wreck is overgrown by shells. Large scorpionfish and conger eels also seek for shelter inside it.

**LOCATION’S SPECIFICITY:** wreck of a cargo ship.

**DEPTH:** 60 – 65 m.

**SUBMERSION DIFFICULTY:** exclusively advanced divers.

**PHOTOGRAPHS:** Borak shipwreck. Photo: Moana.
Wooden ship Zlarin

COORDINATES: 43°40′44″N 15°50′31″E

Anchoring is made in a little cove, twenty meters from the coast. At the depth of 10 m, the rocky sea bed becomes a Neptune grass meadow, above which we often encounter schools of striped mullet. The wreck lies on sandy sea bed, in westerly direction. The bow is situated at 20 m, and rudder on 35 m. The right rudder side is complete, while the rest of the wreck has collapsed so there are many holes with gilt-head bream, conger eels and some spiny lobsters. We also frequently encounter scorpionfish, and schools of white seabream around the deeper part of the wreck. Thirty meters from the bow, southward, there is a smaller wall beginning at 18 m and falling to 35 m. It is overgrown by sponges and full of holes with scorpionfish and squat lobsters (*Galathea strigosa*).

**HABITATS:** light-loving algae, Neptune grass, coralligen, detritic bed.

**LOCATION’S SPECIFICITY:** a shipwreck with plenty of fish.

**DEPTH:** to 35 m.

**SUBMERSION DIFFICULTY:** suitable for all categories but beginners.

**PHOTOGRAPHS:** Wooden wreck. Photo: Sara Kaleb. School of striped mullets *Mullus surmuletus*. Photo: Sara Kaleb. School of young greater amberjack *Seriola dumerili*. 
Rock Kamičac is situated west from Komorica, and it is especially interesting because of two parallel rocks that stretch southward. On a sandy sea bed, between the rocks, at the depth of 25 m, we encounter amphorae remains and other ancient ceramics. In late summer, we can find dusky grouper – sometimes even several of them in the same dive.

**Habitats:** light-loving algae, sandy sea bed (deeper than 25 m).

**Location’s Specificity:** amphorae remains, dusky groupers.

**FTH:** to 45 m.

**Submersion Difficulty:** the deeper part suitable for experienced divers, and the shallow for all categories.

**Photographs:** Sandy sea bed organisms: golden anemone *Condylactis aurantiaca*. Photo: Cro-Pro-Scuba. Sandy anemone *Phymanthus pulcher*. Bristle fanworm *Myxicola infundibulum*. 
The diving begins near the lighthouse, where the terrain gently falls, and the rocky part becomes a Neptune grass settlement after 12 m. Deeper than 25 m, we find very specific mushroom-shaped stones, under which lives a very rich animal world. There are several very interesting stone ravines southward. South-westward, at the depth from 15 to 35 m, the sea bed turns into a steeper wall overgrown by sponges. In holes we frequently see spiny lobsters.

**HABITATS:** light-loving algae, Neptune grass settlement, coralligen, detritic bed (deeper than 35 m).

**LOCATION’S SPECIFICITY:** very rich flora and fauna.

**DEPTH:** to 35 m.

**SUBMERSION DIFFICULTY:** suitable for all diving categories. Dive out near the shore because of waterway.

**FOTOGRAFHS:** Squat lobster *Galathea strigosa*. Photo: Sara Kaleb. Cocoon with sea slug’s eggs. Photo: Sara Kaleb. Diving around the southern cape of Zlarin. Photo: Sara Kaleb.
Anchoring is done on the southwest side of Drvenik, near the coast and the cave. The cave entrance is at 28 m depth and is around 2 m high, so it is very easy to enter the cave. In the first part of the cave, there is a room abounding in different sponges and cnidarians. Deeper in the cave, there is a smaller room poorly inhabited by organisms due to lack of light and poor food inflow from the open sea. Typical sea cave biocenosis is developed in complete dark. The room stretches to 19 m in depth. Visibility in the cave is excellent, but divers must be careful to swim slowly and away from the sea bed so as to avoid raising the fine ooze. At the cave exit, we often find plenty of fish young on the left side, and spiny lobsters, scorpionfish, sea slugs and sponges on the cave ceiling.

**HABITATS:** sea caves, coralligen, detritic bed (outside the cave).  
**LOCATION’S SPECIFICITY:** sea cave.  
**DEPTH:** to 30 m.  
**SUBMERSION DIFFICULTY:** suitable for all diving categories but beginners.  
**PHOTOGRAPHS:** The cave entrance. Goldsinny wrasse *Ctenolabrus rupestris*. Photo: Sara Kaleb. Sea slug *Hypselodoris elegans*. Photo: Sara Kaleb.
South from the island of Oblik, we find around 200 m long underwater step, stretching to the depth of only 1 m. Its end is marked by a black buoy. There are many holes and ravines with plenty of fish on the reef. Deeper than 12 m, the terrain becomes a Neptune grass settlement, and deeper than 20 m a vertical wall falling to 35 m in depth. There are many sea slugs at the very top. The wall, especially its bed ravines, abounds in typical coralligenous underwater sea bed organisms, especially a rich yellow crusty anemone settlement, while yellow gorgonians are rare.

**HABITATS:** light-loving algae, Neptune grass settlement, coralligen, detritic bed (deeper than 35 m).

**LOCATION'S SPECIFICITY:** rich yellow crusty anemone settlement.

**DEPTH:** to 35 m.

**SUBMERSION DIFFICULTY:** suitable for all diving categories. Caution required due to sea traffic!

At the very entrance to the St. Ante channel, a small shelf appears on the right side. Anchoring is done south from the rock, and diving begins westward. This area is under the influence of the river Krka, so salinity is low at the surface, and high in the depth. The wall steeply falls to 30 m in depth, and towards the channel entrance to more than 40 m. Due to sediment inflow from the river, the visibility can be rather low. Because of many plankton and organic particles, many sponges and cnidarians live here, densely inhabiting the wall and coloring it yellow and orange. On the shallow part, there are various species of bivalves that also use nutriments brought in by the fresh water.

**HABITATS:** specific river mouth area.

**LOCATION’S SPECIFICITY:** the most beautiful experience is night diving, when the richness of the rock colors is fully accentuated.

**DEPTH:** to 40 m.

**SUBMERSION DIFFICULTY:** suitable for experienced divers and beginners with escort. Strong surface currents and low visibility.

**PHOTOGRAPHS:** Cape Ročni and St. Nikola fortress. Yellow crusty anemone *Parazoanthus axinellae* on sponge *Axinella verrucosa*. Sponge *Axinella cannabina* with cuttlefish eggs.
Čapljina is the biggest cove in St. Ante channel. Its eastern cape is extremely rich in life, due to strong currents and nutrition inflow from the river Krka. Because of the Krka, salinity is low at the surface and higher in the deep. At 10 m in depth, we meet an animal world that uses plenty of nutrients. A lying rock falls to 25 m in depth and is overgrown by sponges, cnidarians and bivalves. On the sea bed, there is a pen shell settlement and a lot of cnidarians of the species *Veretillum cynomorium*. In the shallower part, we can see dense Mediterranean mussel colonies.

**Habitats:** specific river mouth area.
**Location’s Specificity:** very diverse animal world on a small area, specific river mouth organisms.
**Depth:** to 25 m.
**Submersion Difficulty:** suitable for all diving categories.
**Photographs:** Cnidarian coloured tube anemone *Cerianthus membranaceus*. Pen shell *Pinna nobilis*. Scallop shell *Flexopecten glaber*. 
Cape Zvizda
KOORDINATE: 43°46’37”N 15°50’21”E

This position is situated on the western side of St. Josip channel. The locality’s specificity is a wall, falling vertically from 3 to 25 m in depth. Due to constant currents and nutrition inflow from the Krka, the wall is overgrown by numerous sponge and cnidarian species. Because of the river, the salinity is low at the surface and high in the deep. On the sandy sea bed, at 25 m, there is a dense cnidarian settlement (Veretillum cynomorium) and many scallop shells. In the shallower part, there are many bivalves, such as Noah’s arch and the Mediterranean mussel.

HABITATS: specific river mouth area.
LOCATION’S SPECIFICITY: rich animal world, specific river mouth organisms.
DEPTH: to 25 m.
SUBMERSION DIFFICULTY: suitable for all diving categories. Diving in and out must be done near the shore, because of sea traffic.
Northwest from Tmara, there is a 20 m deep reef, known among divers as Katedrala. Anchoring is done around the middle of the cliff and diving begins southward. At the reef top, there is a white gorgonian settlement. On the very south of the wall, there is a small cave, always full of large two-banded breams, sharpsnout breams and white seabreams. Diving westward, the vertical wall falls from 25 to 45 m in depth. The wall is overgrown by yellow gorgonians, and it is possible to see a cnidarian red finger. Spiny lobsters, slipper lobsters, larger forkbeards and scorpionfish have settled in the deep.

**HABITATS:** light-loving algae, coralligen, smaller sea caves, detritic bed (deeper than 43 m).

**LOCATION’S SPECIFICITY:** extremely rich plant and animal world.

**DEPTH:** 20 – 45 m.

**SUBMERSION DIFFICULTY:** only for experience divers (higher categories).

**PHOTOGRAPhS:** Mediterranean slipper lobster *Scyllarides latus*. White gorgonian *Eunicella singularis*. Photo: Sara Kaleb. Larger forkbeard *Phycis phycis*. Photo: Sara Kaleb.
On the western cape of Tmara, we find a concrete pyramid, from which we anchor 50 m eastward. Diving begins in a southern direction. A nice underwater wall, abounding in yellow gorgonians, begins at 12m and ends at 33 m. It is full of various fish and crab species, especially spiny lobsters. On the sandy sea bed, from 33m to 40 m, we frequently find the protected tun snail. On the way out, we come across a shallow part (from the surface to 6 m in depth), which is especially beautiful and ideal for beginner divers. Big schools of two-banded breams, saddle breams and cow breams are common here, and in shallow ravines we can see the dusky grouper.

HABITATS: light-loving algae, coralligen, detritic bed (deeper than 33 m).
LOCATION’S SPECIFICITY: frequent large fish schools.
DEPTH: to 40 m.
SUBMERSION DIFFICULTY: suitable for all diving categories and anyone willing to try diving.
The ship is anchored around 150 m west from Smokvica (near Primošten), at 12 m in depth. Submersion begins in southern direction. When a depth of 20 m is reached, we go westward, where the wall gradually falls to 45 m. The entire wall is rich in yellow gorgonians, but also larger forkbeards, scorpionfish and morays. At 30 m, a medieval 2 m high anchor is firmly attached to the sea bed. Spiny lobsters live in holes deeper than 40 m.

HABITATS: light-loving algae, coralligen.
LOCATION’S SPECIFICITY: coralligen with yellow gorgonians.
DEPTH: 12 – 45 m.
SUBMERSION DIFFICULTY: for experienced divers; caution while diving out because of waterway.
PHOTOGRAPHS: Mediterranean moray *Muraena helena* Cnidarian sunset coral cup *Leptopsammia pruvoti*. Yellow gorgonian *Eunicella cavolini*.
There are several interesting locations on the island of Grbavac, but the most interesting is its western part. We anchor near the island shore and dive in the northern direction. The underwater wall begins at 8 m and steeply falls to 25 m in depth. There, on a sandy sea bed, is a beautiful cave full of vivid colors. Further northward, there is a wall with yellow gorgonians to 45 m in depth. On the way back, we encounter many fish species in the shallower part. The shallow part near the coast is suitable for diving classes and people willing to try diving. Note: diving westward also leads to a similar wall.

**HABITATS:** light-loving algae, sea caves, coralligen, detritic bed.

**LOCATION’S SPECIFICITY:** coralligenous walls.

**DEPTH:** to 45 m.

**SUBMERSION DIFFICULTY:** suitable for all diving categories; surface current can sometimes be rather strong.

**PHOTOGRAPHS:** Cave ceiling with cnidarians *Madracis pharensis* and various sponge species. Bristle worm *Protula* sp. Red alga *Platoma cyclocolpum*.
Approximately 200 m south from the island of Grbavac, there is a reef emerging from the depths. Its shallowest part is only a meter under the surface. We anchor 20 m northeast from the reef mark, at the depth of 3 – 4 m. Upon submersion, a hole with many living organisms, 20 m wide and 8 m deep, opens under us. Diving is continued southward, along a wall falling to 45 meters. The wall occasionally becomes sand. On the way back, on the shallowest part, there is a vertical cave entrance. Due to the strong current, it is best to end in the large hole near the boat.

**HABITATS:** light-loving algae, sea caves, coralligen (relatively poor), detritic bed.

**LOCATION’S SPECIFICITY:** sea caves and an interesting hole.

**DEPTH:** to 45 m.

**SUBMERSION DIFFICULTY:** suitable for experienced divers, while beginners can only dive in the shallow part; avoid diving in case of strong currents.

**PHOTOGRAPHS:** Mediterranean cardinalfish *Apogon imberbis*. Red-mouthed goby *Gobius cruentatus*. Bristle worm *Serpula vermicularis*. 

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Reef Grbavac

COORDINATES: 43°33’38”N 15°53’07”E
Lighthouse Mulo
COORDINATES: 43°30′48″N 15°55′07″E

The locality offers the possibility of diving in all directions, but the south-easterly part is the most interesting. There, on a shallow depth, we find an interesting area built out of large rocks and Neptune grass. Further on, there is a wall stretching deeper than 65 m. Gorgonians have developed deeper than 40 m. On the north-eastern side, at 10 to 20 m, there is a sea bed with large rocks, under which many interesting organisms live.

HABITATS: light-loving algae, Neptune grass settlement, smaller sea caves (under the rocks), coralligen.
LOCATION’S SPECIFICITY: habitat and species diversity.
DEPTH: to 65 m.
SUBMERSION DIFFICULTY: suitable for all diving categories; due to open sea, the current can be rather strong.

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On the south-western side of the island, there is a small horseshoe-shaped cove, near which we anchor. Diving begins in a westerly direction along a wall that gradually falls to over 80 m in depth. Deeper than 30 m, the wall is extremely abundant in red gorgonians, so thick that it resembles a forest. In the shallower part, we can see many fishes. The shallow cove, near the anchored boat, is very interesting because of very rich flora and fauna.

HABITATS: light-loving algae, coralligen.
LOCATION'S SPECIFICITY: extremely dense red gorgonian settlement.
DEPTH: over 80 m.
SUBMERSION DIFFICULTY: suitable for all diving categories.
It is recommended to start diving on the northern side of the island, near the dock. Submersion begins with a north-eastward direction and very quickly leads to a ravine between two rocks, where, at 15 – 18 m, we almost always see a smaller dusky grouper. Continuing on there is a wall falling to 35 m in depth, rich with coralligenous organisms, especially red gorgonians. Furthermore, there are many amphorae fragments, and the lead part of an ancient anchor. It is advised to use a diving lamp because the dive is in the shaded side of the island.

**HABITATS:** light-loving algae, coralligen, detritic bed (deeper than 35 m).

**LOCATION’S SPECIFICITY:** coralligenous wall and amphorae remains.

**DEPTH:** to 40 m.

**SUBMERSION DIFFICULTY:** suitable for all diving categories.

**PHOTOGRAPHS:** Rainbow wrasse *Coris julis*, male. Venus’s ear *Haliotis lamellosa*. Amphorae remains.
Cape Fauc

COORDINATES: 43°29’53”N 15°57’43”E

Stivančica cove ends in two capes, the western of which is cape Fauc. Diving begins in its inner side, where a wall steeply stretches into the deep. There are many holes and ravines, and the deeper part of the wall is richly overgrown. Red gorgonians are especially frequent here.

HABITATS: light-loving algae, coralligen.
LOCATION’S SPECIFICITY: very good visibility; rich and diverse flora and fauna.
DEPTH: over 65 m.
SUBMERSION DIFFICULTY: suitable for experienced divers; beginners can dive in the shallow part, in the inner side of the island.
PHOTOGRAPHS: Anemone Aiptasia mutabilis. Moss animal Reteporella sp. Two-coloured red gorgonian Paramuricea clavata.
Cape Ploča closes the southern side of Stivančica cove. Cape Ploča (*ploča* = board) was named after a stone board that seems to be lying on the very sea surface. We anchor near the cape and dive in heading south-westward. The terrain drops in cascades to deeper than 65 m, where we encounter plant and animal world specific to the southern Adriatic Sea. Red gorgonians are especially well developed. Diving must always be started in the direction of sea currents, so as to reach the boat at the end.

**HABITATS:** light-loving algae, coralligen.

**LOCATION’S SPECIFICITY:** very good visibility; diverse and rich flora and fauna.

**DEPTH:** over 65 m.

**SUBMERSION DIFFICULTY:** suitable for experienced divers; the current can be rather strong.

**PHOTOGRAPHS:** Conger eel *Conger conger*. Photo: Pongo. Coralligenous community and sponge *Haliclona mediterranea*. Slug snail and green alga *Palmophyllum crassum*. 
Eco Dive is shallow diving around the island of Kalebinjak near Rogoznica. The diving usually starts on the western side of the island, and works counter-clockwise. The eastern side, with many morphologically interesting rocks is the most attractive. In cooperation with sea biologists, underwater boards with descriptions of local species have been set on this site. It is possible to see morays, scorpionfish, conger eels, many fish schools, different cnidarians (among which the beautiful anemone *Alicia mirabilis*), slug snails, colorful algae and different starfish. The diving provides a tour around the entire island. Not to be missed – especially at night!

**HABITATS:** light-loving algae.

**LOCATION’S SPECIFICITY:** very good visibility and extremely rich flora and fauna.

**DEPTH:** to 20 m.

**SUBMERSION DIFFICULTY:** suitable for all diving categories.

**PHOTOGRAPHS:** Anemone *Alicia mirabilis*. Striped blenny *Parablennius rouxi*. Red starfish *Echinaster sepositus*. 
The program of monitoring gelatinous organisms

Although jellyfish are common organisms in the Mediterranean Sea, up until recently the appearance of rich jellyfish swarms was rare.
Jellyfish swarms now present a problem for tourism, especially for swimmers and fishermen (jellyfish gather in their nets). Furthermore, it is a problem for the open sea ecosystem, which is being debilitated because jellyfish overfeed on planktonic organisms. The possible causes of this could be excessive sea organism hunting, destruction of the environment or climate change. However, the real cause for their mass appearance is still largely unknown. The project of monitoring jellyfish and other gelatinous organisms was started to begin collecting data on jellyfish distribution and appearance in the Mediterranean Sea. Sea lovers and users, including divers, are asked to contact researchers and take part in their research.

Contact us via e-mail:
adam.benovic@unidu.hr

More information on
www.ciesm.org/marine/programs/jellywatch.htm
The program of monitoring foreign algae of the genus *Caulerpa*
Two algae from Australia, *Caulerpa racemosa* and *Caulerpa taxifolia*, are quickly spreading in the Mediterranean Sea. They grow dense communities, stretching from the inter-tidal region to the depth of 50 m, thereby causing drastic changes in biological, ecological and landscape diversity. The majority of their colonies have been found thanks to various sea users who contacted researchers.

*Caulerpa taxifolia* is a fluorescent green alga with a crawling branched stem that can grow over 1 m in height. The stem is attached to the sea bed by numerous long roots. Small feather-like leaves, from 5 to 65 cm long, grow or branch from it. In Croatia, it has been found in Malinska, near the island of Rab and in the Starograd Bay (the island of Hvar).
*Caulerpa racemosa* is a dark green alga. It has a branched, crawling stem, which grows leaves from 1 to 20 cm long. On the leaves there are many round barbs, and the alga itself is attached to the sea bed by tiny roots. In Croatia, it has been found on more than 100 localities.

If you find these algae, contact us via e-mail
caulerpa@izor.hr

More info on: [http://jadran.izor.hr/kaulerpa](http://jadran.izor.hr/kaulerpa)
Diving centers in the Šibenik–Knin County

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Developed within the framework of UNDP project "Conservation and Sustainable Use of Biodiversity in the Dalmatian Coast through Greening Coastal Development – COAST" (www.undp.hr/coast), in cooperation with the Šibenik – Knin County and the Public Institution for Management of Nature Protected Areas in Sibenik–Knin County.

The COAST project operates in all four Dalmatian counties – Zadar, Šibenik-Knin, Split-Dalmatia and Dubrovnik-Neretva – with $7 million in financial support from the Global Environment Facility (GEF). The project is implemented in cooperation with the Ministry of Environmental Protection, Physical Planning and Construction. Project partners include Development Agencies in all four Dalmatian Counties. Through the Green Business Support Program, the COAST Project provides financial and technical assistance for the preservation of biological and landscape diversity in key economic sectors, including agriculture, tourism, fishing and mariculture. In partnership with Splitska banka and Jadranska banka, it also promotes “green” lending.