Further Reading

Spratly Islands

**Category:** Marine and Oceanic Biomes.
**Geographic Location:** South China Sea.
**Summary:** This marine environment, including more than 750 reefs, islets, atolls, cays, and islands, has a rich ecosystems, but is mired in a tug-of-war between several nations.

The Spratly Islands are located in the central region of the South China Sea. In Vietnam, they are known as the Truong Sa Islands, in the Philippines as the Kalaya'an Island Group, and in China as the Nansha Archipelago. Ownership of the islands is disputed by China, Vietnam, Malaysia, the Philippines, Brunei (Darussalam), and Taiwan. Also, it is important to note that Japan receives 90 percent of its oil shipped through this area. Each of these nations claim some or all of the islands, along with their adjacent marine territories and resources. Despite disputed ownership, the Spratly Islands and surrounding waters have remained prolific marine ecosystems, with many unique reefs, fish, and other marine species.

**Geography and Climate**

The reefs of the Spratly Islands are spread over 155,000 square miles (400,000 square kilometers) in a region measuring about 500 miles (800 kilometers) from north to south and 560 miles (900 kilometers) from east to west. There are eight low, sandy islands, 26 reefs, 21 shoals, and 10 submerged banks, with a total land area above water of less than 2 square miles (5 square kilometers). This is because most of the reefs in the Spratly Islands are submerged at high tide. Atolls here have high species diversity, including many fish, seabirds, and turtles. Ongoing industrial development and additional surveys suggest that there are significant reserves of oil and natural gas beneath the ocean floor here.

The Spratly Islands have a southern tropical climate, with an average annual temperature of 81 degrees F (27 degrees C). Summer is from May to August, with an average temperature of about 86 degrees F (30 degrees C). Winter is not much cooler, with an average temperature of 77 degrees F (25 degrees C). The islands have a seven-month dry season and a five-month rainy season. Southeast monsoon winds blow from March to April, with southwest monsoon winds from May to November. Few of the islands have substantial freshwater resources.

**Flora and Fauna**

The Spratly Islands encompass several hundred coral reefs in one the world’s most diverse seas. The marine environment is a breeding grounds for sea turtles, birds, marine mammals, and tuna. It is thought that the larval form of marine invertebrates in this area may supply other marine ecosystems throughout the South China Sea. In the future, the Spratly Islands may play a crucial role in seeding and restoring some of the over-harvested marine populations throughout the South China Sea.

Much is known about the marine environment, but less has been recorded about the terrestrial environment here. Little vegetation grows naturally on these islands, which are subject to intense monsoons. The few larger land surfaces have tropical and scrub forests and grasses. Several islands were in the 1930s covered with shrubs, mangroves, coconut, and pineapple. Papaya, banana, and palm may have been cultivated on some of the islands in more distant history. A few islands have been
developed as small tourist resorts; soil has been added and trees planted. Very few humans occupy this marine region on a regular basis, however, with the exception of several military establishments.

Marine turtles and many species of seabirds visit the islands. The green turtle and hawksbill turtle are still found here. Seabirds use the islands for nesting, breeding and overwintering. These avians include streaked shearwater, brown booby, red-footed booby, great crested tern, and white tern.

**Human Impact**
The terrestrial and marine ecosystems in the Spratly Islands are under stress from increasing human activities. Military groups that occupy the islands on behalf of different countries shoot turtles and seabirds, and raid birds’ nests for eggs and young. Harvesting of rare medicinal plants and cutting of timber are additional threats. The marine environment is under stress from overfishing and the use exploitative methods of harvesting fish and invertebrates, such as the use of bottom trawling, explosives, or poison.

The danger of rising sea levels due to global climate change threatens to permanently submerge many of these landforms. More immediate threats to the region appear to be from the strategic importance of location, with seven nations in persistent conflict over the area eying the value of shipping lanes, fisheries, and ocean bed mineral and hydrocarbon resources.

An international marine park has been suggested for portions of the Spratly Islands. If accepted by the countries claiming ownership, this designation could safeguard fish, birds, turtles, and other fauna. The ecological benefits to the biome could also extend to commercial interests, by helping to ensure a steady supply of young fish and invertebrates for regional fisheries.

**Further Reading**


Lally, Mike. “Spratly Islands Strategic Importance and Rising Sea Levels.” *Inventory of Conflict and Environment Case Studies* 226 (December 2010).


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**Srebarna Lake**

**Category:** Inland Aquatic Biomes.

**Geographic Location:** Eastern Europe.

**Summary:** Srebarna Lake is the only significant Danubian wetland in Bulgaria; it shelters a significant percentage of the endangered Dalmatian pelican.

At roughly 2.5 square miles (6.5 square kilometers), including wetlands and the lake, Srebarna is the largest river lake in Bulgaria. Surrounding and protecting the freshwater lake from intrusion is the Srebarna Nature Reserve, a World Heritage Site. The lake and reserve are located approximately 100 miles (160 kilometers) from the Black Sea to the southeast, and 85 miles (140 kilometers) from Bucharest, Romania to the northwest. The combined ecosystem incorporates former farmland, a belt of forest plantations along the river, three islands in the Danube River, and the water between the island and riverbank. Vegetation here is that of the Ukraine-Kazakh biotic province. Adjacent to Srebarna is the Pelikanite, another, nearly 2-square-mile (5-square-kilometer) enclave of protected pelican environment. The main purpose of the reserve is wildfowl protection for half of the avifauna in Bulgaria; this area is on the Western Palearctic bird migratory flyway.

Srebarna Lake is quite close to the Danube River, which provides seasonal flooding of the