Kushiro Marsh is the largest wetland in Japan, with an area of 17,570 hectares. The marsh is composed of areas of sedge-reed bog, peat moss bog, and Japanese alder forests. The marsh ground has three different layers. Extending 1–4 m below the surface, the top layer consists mainly of peat deposits. Peat is sediment made of plant matter that does not fully decompose in the cold water of the marshlands. Kushiro Marsh accumulates about 1 mm of peat every year. Below the peat is a layer of mud or sand, and the lowest layer is made of pebbles and fossilized seashells, remnants of a time when the marshland under the sea.

The formation of the marsh dates back many thousands of years. Around 6,000 years ago, the present-day marsh was part of Old Kushiro Bay, an area formed when rising sea levels inundated low-lying regions and moved the coastline inland. This geological event is known as the Jomon Transgression, named after the Jomon period (14,000 BCE–300 BCE). Around 4,000 years ago, the climate cooled and the sea began to retreat. Sand dunes formed at the mouth of the bay, completely cutting off the area from the ocean, which led to a number of salt-water lakes forming within the interior of the old bay approximately 3,000 years ago. These bodies of water formed the basis of the Kushiro Marsh.