Welcome to the En Afeq Nature Reserve

The En Afeq Nature Reserve is located in the Acre Valley. At 66 hectares, it is the largest wetland nature reserve in Israel's western drainage basin. The reserve, officially declared in 1979, encompasses the upper part of the Na'aman Stream and its sources. The reserve is unique in that it protects the swamp's scenery and the sources of the stream, which are a remnant of the swamps that once extended on both sides of the Na'aman, covering about 2,000 hectares of land south of Acre. The rich waterscapes in the reserve include springs, tributaries, perennial pools and seasonal pools (those that dry up in the summer), groundwater pools, a meadow and a swamp, a section of a stream, and even a rain pools (vernal pools).

The reserve is home to a variety of plants and animals characteristic of a wetland. Aquatic species include adrue *(Cyperus articulatus)*, blue water lily *(Nymphaea nauchali)*, and brookweed *(Samolus valerandi)*. Among the animals are water buffalo and a number of invertebrates including snails and insects.

The locals call this island of green, surrounded by urban development, the "green lung of the valley." In addition to its many natural treasures, the reserve also encompasses significant elements of heritage including Tel Afeq, which attests to human settlement in the fertile Acre Valley dating back to the Middle Bronze Age. The tell is believed to be biblical Afeq, a Canaanite city in the area of the tribe of Asher (Josh. 18:30).

In 1996, the unique natural and heritage aspects of the reserve were recognized and it has been inscribed on the "List of Wetlands of International Importance" of the Ramsar Convention on Wetlands.

The Water in the En Afeq Nature Reserve

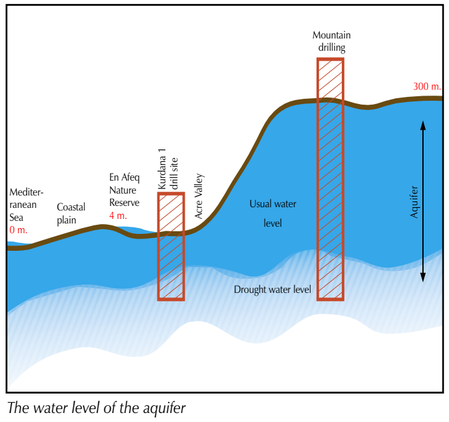
The Afeq springs, the source of water for the En Afeq Nature Reserve, created the landscape of swamp, pools, and the Na'aman Stream. The springs are fed by the Na'aman aquifer, which includes areas in the western Lower Galilee and the eastern Acre Valley. The stream's drainage basin covers an area of 317 square kilometers, and receives an average annual rainfall of about 600 mm. From here, the Na'aman Stream flows for about nine more kilometers to its estuary at the Mediterranean Sea south of Acre.

The spring water now drains through a network of channels to the Na'aman Stream. These channels are a remnant of the system built to drain the swamp during the British Mandate period. A historical map from 1920 shows 35 springs in the area. The educator and nature scholar Pinchas Cohen describes boating along the stream in 1935, when the area was an extensive swamp covered with spectacular vegetation "like a real jungle." In the 1940s, the discharge rate of the spring was found to be nearly equal to the refill of the drainage basin from rainfall.

Since the 1960s, Israel began drilling in order to pump water from the Na'aman aquifer to supply drinking water and water for agriculture. Increased pumping, beyond the natural refilling of the aquifer by rain water, has frequently caused the level of the aquifer to fall below the discharge height of the springs, to the point where they completely dried up. Consequently, water quality dropped, as did the average discharge rate of the springs, from 50 mcm/year (million cubic meters) to only 2 mcm/year in a drought year. As a result, the flora and fauna in the reserve were damaged and biological diversity dwindled.

Why is the reserve drying up?

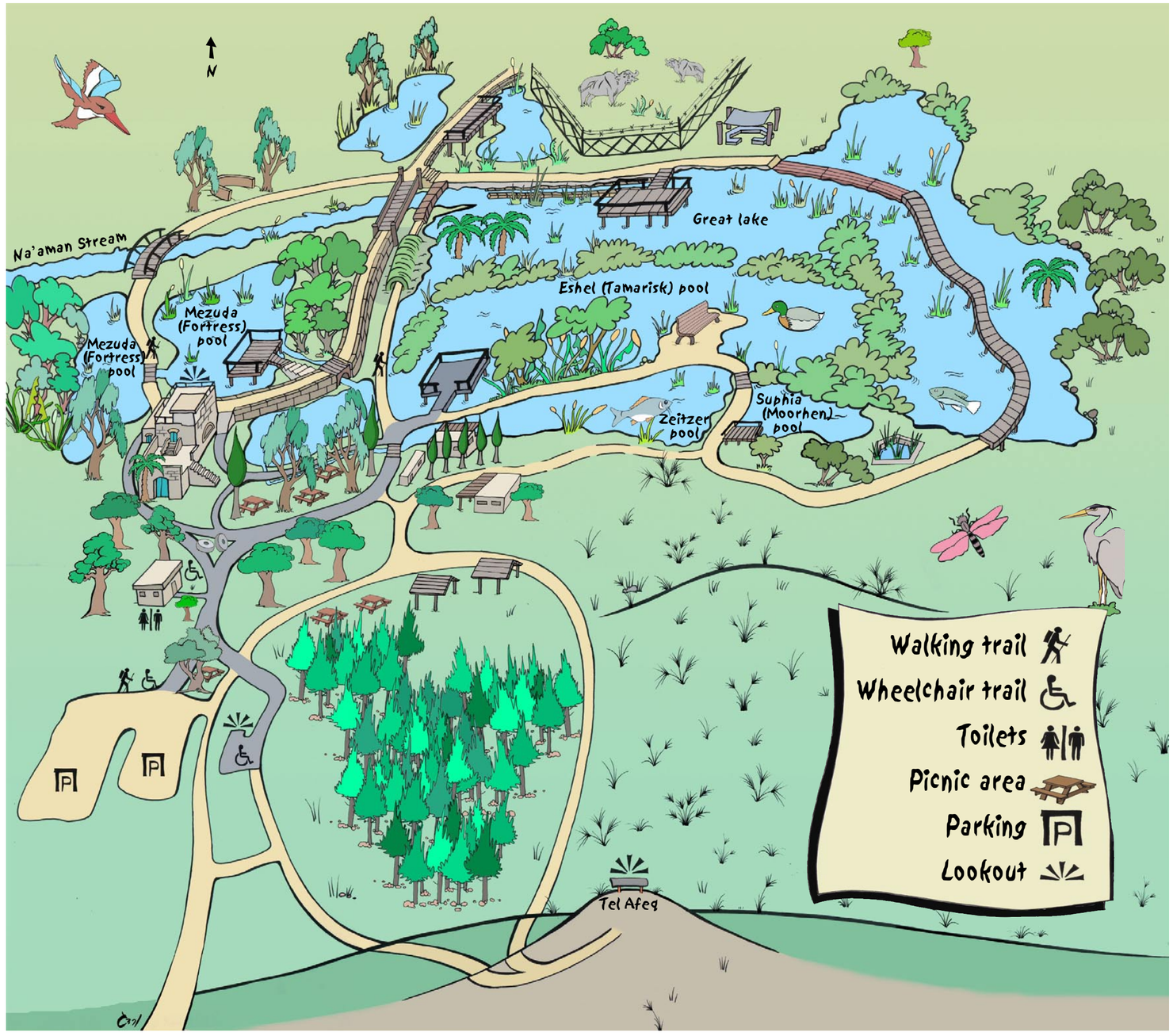
The En Afeq springs are the natural outlet for the ground water of the Na'aman aquifer. Rain falling upstream contributes each year to a rise in the level of the ground water and the continued flow of the springs. The government has established a drilling network over the upper basin area during the past few decades, and allowed pumping of the Na'aman aquifer's water. When the volume of water pumped exceeds the natural refilling of the aquifer at a specific year, the water level drops and the springs die. This over-pumping also affected the springs' salinization.



The water level of the aquifer

When the springs dry up the ecosystem, including plants and animals that cannot live without water, is damaged. Some plants and animals are pushed to areas of the reserve that still contain water, while others become extinct.

During recent drought years, digging and deepening in the bodies of water in the reserve was carried out in order to reach the water table. Water supply from a nearby drilling site was assured in case of an interruption in the natural flow of the spring, so as to avoid total damage to the reserve's ecosystem.



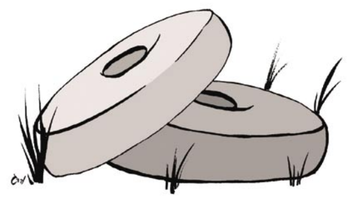
The Tour Route

The tour route begins at the Crusader flour mill, which has a beautiful view of the reserve from the roof. The mill building contains a display of agricultural tools and an audio-visual presentation.

The Flour Mill – the Western Crusader Building and the Western Dam

Why was a flour mill built here in the Crusader period?

During the Crusader period, this whole area was flourishing agricultural land. Various kinds of grain were cultivated here and brought to the En Afeq mill, which operated on the water power of the Na'aman Stream, to be ground into flour. The Crusaders strengthened and fortified the fortress structure, and added windows and loopholes (narrow shooting slits), some of which



can still be seen. The Crusaders also built a dam to increase the efficiency of the mill. The ground flour was shipped to Acre in boats via the Na'aman Stream.

How did the mill work?

If you walk around to the back of the mill you'll see a stone wall on the southern side, and another stone wall on the eastern side. These walls were built to dam the Na'aman Stream, impounding and raising the water level of the mill pool. From here, the water was channeled via a short aqueduct to chutes in the mill building. The dam was about 625 meters long and 2.5 meters high. It created a large pool, "the mill pool," east of the building.

On the western side of the building, you can see a system of five narrow openings that led the water via a chute to five arched basement chambers. Here horizontal paddlewheels were installed, creating five milling units.

The water flowed powerfully through the sluice, hit the paddles, and turned the wheel. The wheel was connected in the center to a wooden pole that passed through the basement ceiling and up into the milling room. This mill had two milling rooms. In one, where the audio-visual presentation is now shown, there were four pairs of mill stones. The other room, at the entrance (to the left of the audio-visual room), had only one pair of millstones.

A pair of millstones includes two round stones placed one on top of the other. The lower one was stationary; the upper one turned on it, grinding the kernels of grain into flour. The miller would fill the hopper (the grain holder) that hung above the mill stones.

The View from the Roof of the Mill

The roof of the mill affords a panoramic view of the Acre Valley. To the north, the Upper Galilee and the Ladder of Tyre ridge can be seen. On the east are the Alonim-Shfar'am hills, which turn into the western slopes of the Lower Galilee ridge. To the south is Mount Carmel, and to the west is the group of bayside cities known as the Krayot. Between their high-rises, the Mediterranean Sea can be glimpsed. The entire reserve is at your feet, including the "western thicket," the "eastern thicket" and Tel Afeq.

On the outside of the fortress are several species of plants that typically grow out of walls. Among them are golden henbane *(Hyoscyamus aureus)*, wall pellitory *(Parietaria judaica)*, grey calamint *(Parietaria judaica)*, African fleabane *(Phagnalon rupestre)*, and common caper *(capparis spinosa)*.

The Mezuda (Fortress) Pools

The two fortress pools located north of the flour mill were dug in 1982 in order to increase the area of water in the reserve and create an additional habitat supported by shallow ground water that will exist even in drought years.

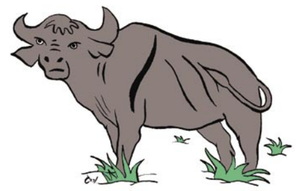
The Channel Junction

You are standing at a lookout near the dam that was built during the Crusader period above the reserve's main drainage channel. The network of concrete channels you see here was built in the 1930s as part of the swamp drainage system and to augment utilization of the water. In the past, a portion of the spring water was utilized by the oil refineries in the Haifa Bay. Today, all the water flows through the drainage channel next to you, through the dam's opening into the Na'aman streambed, which flows north for about nine kilometers before it spills into the Mediterranean south of Acre.

The Meadow (The lookout onto the fenced pasture for the water buffalo)

Why raise water buffalo in the reserve?

The water buffalo is a member of the bull family that tends to keeps to water and is mud and is used to living in a warm climate. In the past, before the Na'aman swamps were drained, herds of water buffalo brought from Egypt lived in the area. They served as work animals and provided milk for the Bedouin families of the



Ghorna tribes that lived on the edge of the swamp at the end of the Ottoman period. Members of the tribe raised sheep and goats and maintained a cottage industry of mat- and basket-weaving from reeds; reedmace, rushes and cyperus.

In order to protect the meadow in the northern part of the reserve and to protect the pastoral regime by herbivores, seven water buffalos were brought here from the Hula Nature Reserve in 1991. The buffalo's grazing load curbs the growth of trees and maintains open pastures.

The Great Lake

We can see a large body of water that is part of the wetland landscape. In the past, aquatic species covered the water's surface, such as Gibbous duckweed *(lemna gibba)*, common water-crowfoot *(Ranunculus aquatilis)*, yellow pond lily *(nuphar lutea)*, and blue water lily *(Nymphaea nauchali)*. This vegetation has dwindled due to dry periods and lack of stability in the water level; some have disappeared from the reserve. The tamarisk trees surround the lake in a thick belt and various riparian plants compete for a good spot near the water.

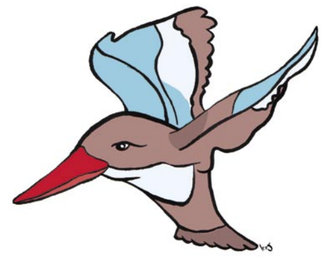
Why were the swamps drained?

Between 1937 and 1939, three kibbutzim were founded in the northern Acre Valley: En Hamifraz, Kefar Masaryk, and Mishmar Hayam (which eventually became Kibbutz Afeq). However at that time both banks of the Na'aman were covered with swamps that could not be cultivated and that were a habitat for anopheles mosquitoes that carried malaria. The draining of the swamps was part of preparation of the land for cultivation and to rid it of malaria. To do so, the pioneers dug channels that led the swamp water into the Na'aman Stream, which was maintained and deepened as far as its estuary. Joseph Weitz described the work: "Step by step, piece by piece, we conquered furrows of earth for cultivation from the rule of the swamp, by the work of our hands, by the sweat of our brow, in sickness, over hundreds of days. We stormed the toxic swamp. More than once it overcame us. But we did not give up. We sweetened thousands of dunams of saline swamp that later served for field crops and fish ponds."

What Lives in the Reserve?

The En Afeq Nature Reserve is home to a rich world of animals, from invertebrates to raptors and large mammals. The murky water appears devoid of life, but that is not the case. The pool is a habitat for a number of fish, mollusks and other wetland species.

Here are some of the inhabitants of the swamp.
Birds: Songbirds can be seen around the flooded areas, among them common bulbuls *(Pycnonotus barbatus)* and Palestine sunbirds *(Nectarinia osea)*. In the undergrowth of the swamp and in the water are aquatic and riparian species, which can be seen mainly in the winter. These include black-crowned night herons *(Nycticorax nycticorax)*, little egrets *(Egretta garzetta)*, spur-winged lapwings



(Recurvirostra avosetta), Glossy ibis *(Plegadis falcinellus)* mallards *(Anas platyrhynchos)*, teals *(Anas crecca)*, and others. Some birds spend their nights in the reserve; others also nest there.

Fish: common tilapia *(Tilapia zillii)*, carp *(Cyprinus carpio)*, mosquito fish *(Gambusia affinis)*. The clarid *(Clarias gariepinus)* digs into the mud at the bottom with the help of its flat head and wide mouth with eight "whiskers" that also help it eat. It can reach a length of about 1.5 meters and weigh as much as 30 kilograms. At the end of spring the female lays her eggs in the shallow water among the plants. Clarids have a special respiration system that developed from gills and allows them to breathe oxygen from the air.

Reptiles: Two kinds of turtles live in the reserve, soft-shell turtles *(Trionyx triunguis)* and terrapins *(Mauremys caspica rivulata)*. Agamas *(Agama stellio)*, snakes, lizards, skinks and geckos also live in the reserve. The terrapin has a boney shell covered with green-olive protrusions, and webbed toes. On sunny days they warm themselves on the banks, but plop into the water to dig into the mud at the first sign of any sound or movement. The terrapin eats animals and plants that live in the water. During the mating season, from April to August, the female comes out onto the banks, digs a hole about 15 cm. deep and lays between 5 to 21 eggs. The young turtles hatch three to four months later. The soft-shell turtle is bigger than the terrapin; it can reach a length of 120 cm. and weigh as much as 50 kilograms.

Mollusks: Various kinds of mollusks live in the water, among them: theodoxus, melanoides, and melanopsis.

The melanopsis is a sort of mollusk with a dark shell that lives mainly in streams, springs and lakes. It can be seen at the water's edge sticking to rocks, stones and plant stems. The melanopsis has a mouth with a serrated radula, a kind of a toothed ribbon, with which it scrapes up its food – algae on the rocks. Its "leg" is used for crawling and as a kind of cover to close the shell during dry periods.

Crustaceans: A number of species of crustaceans are found in the water, among them are freshwater shrimp – atyaephyra *(Decapoda)*, and river crab *(Potamon)*.

1. NIMROD'S FORTRESS N.P.
2. HERMON STREAM N.R. (BANIAS)
3. TEL DAN N.R.
4. SENIR STREAM N.R.
5. HORESHAT TAL N.P.
6. IYYON STREAM N.R.
7. HULA N.R.
8. TEL HAZOR N.P.
9. AKHZIV N.P.
10. YEHI'AM FORTRESS N.P.
11. BAR'AM N.P.
12. AMUD STREAM N.R.
13. KORAZIM N.P.
14. CAPERNAUM N.P.
15. BETIHA - BET ZAYDA N.R.
16. YEHUDIYA N.R.
17. GAMLA N.R.
18. KURSI N.P.
19. HAMAT TEVERYA N.P.
20. ARBEL N.P.
21. EN AFEQ N.R.
22. ZIPPORI N.P.
23. HAI-BAR CARMEL N.R.
24. MT. CARMEL N.P.
25. BET SHE'ARIM N.P.
26. NAHAL ME'AROT N.R.
27. DOR HABONIM N.R.
28. TEL MEGIDDO N.P. (ARMAGEDDON)
29. KOKHAV HAYARDEN N.P (BELVOIR) .
30. MA'AYAN HAROD N.P.
31. BET ALFA N.P.
32. GAN HASHELOSHA N.P. (SAKHNE)
33. BET SHE'AN N.P.
34. TANINIM STREAM N.R.
35. CAESAREA N.P.
36. ALEXANDER STREAM N.P.
37. SEBASTIA N.P.
38. APOLLONIA N.P.
39. YARQON N.P.
40. EN PERAT N.R.
41. JERUSALEM WALLS N.P.
42. CASTEL N.P.
43. AQUA BELLA N.P. (EN HEMED)
44. SOREQ CAVE N.R. (STALACTITE CAVE)
45. ASHQELON N.P.
46. BET GUVRIN N.P. (MARESHA)
47. QUMRAN N.P.
48. ENOT ZUKIM N.R. (EN FASHKHA)
49. HERODYON N.P.
50. EN GEDI N.R.
51. EN GEDI ANTIQUITIES N.P.
52. MASADA N.P.
53. TEL ARAD N.P.
54. TEL BE'ER SHEVA N.P.
55. ESHKOL N.P. (BESOR)
56. MAMSHIT N.P. (KURNUB)
57. SHIVTA N.P.
58. BEN GURION'S
59. BURIAL PLACE N.P.
EN AVEDAT N.P.
60. AVEDAT N.P.
61. RAMON VISITOR CENTRE
62. & BIO RAMON
HAI-BAR YOTVATA N.R.
63. (DESERT WILDLIFE)
CORAL BEACH N.R.

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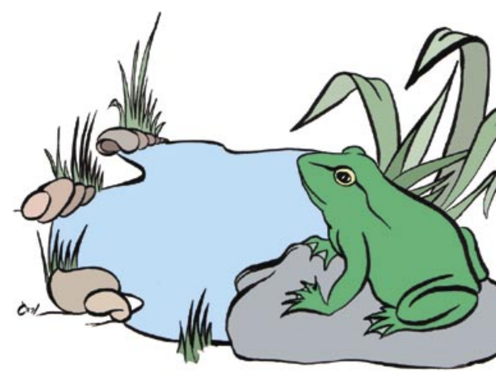
The river crab is a large freshwater crab, which can reach a size of about 7.5 cm long and 8 cm wide and it characterized by its square head and thorax. This crab, which also has a short abdomen, digs burrows close to the water's surface, but also comes out onto the land and looks for hiding places in damp areas and under rocks. The river crab is considered a carnivore and also feeds on carcasses. It mates in the summer, and the female carries the eggs on her trunk legs until the young are born.



Insects: Some insects live their entire life-cycle in the water, among them the water beetle and the water flea. Other insects live their larval stage in the water, among them the various species of mosquitoes, chiromids, dragonflies and damsflies .

The swamp bottom is home to a number of invertebrate species, including many larvae of chironomids and leeches.

Mammals: In addition to the water buffalos, the Egyptian mongoose *(Herpestes ichneumon)* and the invasive species coypu *(Myocastor coypus)*, which can be seen during the day, swim in the water and eat aquatic plants. Nocturnal residents of the reserve include Indian crested porcupines *(Hystrix indica),* which dig into the ground on the tell looking for bulbs and roots to eat, as well as jungle cats *(Felis chaus),* wild boars *(Sus scrofa)*, and northern jackals *(canis aureus)*.

The continuation of the trail crosses a "floating bridge" over the swamp, where visitors can get to know the plants that thrive in the swamp and on its banks, and which bloom in the summer.

The plants do not grow where they do by coincidence. They are continually struggling with one another. Those more suitable to life on the edge of the saline swamp are the survivors of the contest; they grow closer to the water. Plants with other characteristics grow some distance from it. Thus, a belt of vegetation is created around the swamp.

Tamarisk *(Tamarix)* grows on the banks of the pools and in the wetland area of the swamp. The tamarisk has small, serrated leaves, and despite its appearance is not a conifer. In the spring or the fall, small flowers appear, arranged in stalks. The tamarisk is highly resistant to saline soil and needs a great deal of water; thus it is common in the wetland landscape and on the banks of streams and pools.

The common reed *(Phragmites australis)*, a member of the cereal family, can be seen throughout the reserve. The reed has a hard, hollow, straight stalk, with long leaves along the sides and a brush-like florescence. It thrives on stream banks, around springs and in swamps. Its seeds have hairs that help them propagate by allowing them to be carried in the breeze. Reeds have another means of propagation: a crawling root that sends shoots from its joints. Reeds have many uses. Baskets and mats were once made out of them; their stems could be made into flutes, and they also served as pens to be dipped in ink.

Holy Bramble *(Rubus sanctus)* – An evergreen bush that grows thickly along stream banks. The name "holy" comes from the tradition that this was the burning bush that appeared to Moses at Mount Sinai. The holy bramble has hooked thorns along its branches and leaves that help it grab hold of anything, and a tasty fruit.

Narrow-leaved reedmace *(Typha dominigensis)* – The reedmace grows close to the edge of pools or streams and even in the water itself. Leaves as long as two meters, from which baskets and mats can be made, emerge from the planted end of the short stalk.

Sharp Rush *(Juncos acutus)* – This perennial plant with its tubular leaves and stalks as sharp as nails growing straight out of the ground, looks like a round grouping of spikes, and can reach a height of about 1.5 meters. Sharp rushes grow in the wetter areas of the swamp and blossom in spring and summer. They are used as raw material for the weaving of mats and baskets, and a source of plant fibers.

Purple Loostrife *(Lythrum salicaria)* – A large plant that grows close to the water's edge and flowers in purple and violet.

The Mills and the Crusader Orders in En Afeq

About 50 meters from where the "floating bridge" starts, on the northwestern side, is a row of dressed stones. These are the remains of another Crusader mill, the eastern grain mill. This mill was discovered only recently, during the digging work which was done to deepen the water level in the reserve in 1999. (At present, the mill's remnants are covered with water and vegetation and it is inaccessible to the public.)

These remains are the key to understanding the questions concerning the geographic-historical conflict between the Templar and the Hospitaller orders during the 13th century, and especially the question of the identification of the Rakurdana and Dok mills and the location of the communities to which the mills belonged.

Historians knew that the Na'aman Stream was a passageway for agricultural products and that the two Crusader orders had mills and dams along it. They also knew that a feud had long existed between the orders regarding the way the mills would operate, the regulation of the height of the water in the stream, the rules for the use of the water in the dammed lake for operating the mills, as well as for the passage of boats in the stream. Documents of the period reveal that even the pope was called to mediate the conflict between the two orders.

Over the years many scholars have attempted to identify which order built which mill and and dam. In the past, the remains of the western mill and the western dam in the En Afeq Nature Reserve were believed to have been Hospitaller, because of their proximity to the remains of the Hospitaller fortress at Tel Afeq. However this identification was uncertain, and no remains of the Templar dam and mill had been found.

A known Templar fortress located downstream near Tel Daukh (about three kilometers northwest of the reserve and one kilometer east of the Na'aman) led scholars to believe that in the past a mill and dam had also existed there, but no structure that could be identified as a Templar mill was found.

However with the discovery of a second Crusader mill at the northeast corner of the base of the tell, within the Na'aman swamp, the mystery was solved.

Two flour mills and their accompanying dams existed at the same time at the base of the tell, about 370 meters apart. The large, complete and well-known mill of En Afeq Nature Reserve has been identified as the Templar mill of Dok; while the structure found upstream in the eastern part of the reserve (presently submerged), is the Hospitaller mill, Rakurdana. It later took the Arabic name Kurdana, apparently following its complete destruction and submersion by the Na'aman swamp.

The Meshushim (Hexagonal) Spring

On the way, you will pass the hexagonal spring, which got its name from the shape of the structure built around it during the British Mandate, when its water was channeled to the drainage channel system. In rainy years the spring overflows, and visitors can sit beside it and enjoy the sight of its clear water. One permanent resident of the area that can often be seen here is the river crab.

The Suphia (Moorhen) Pool

Before you is a small constructed pool, whose water source is two layer springs that emerge in the bottom.

Many of the water and brush birds have chosen the reserve not only as a rest or overnight stop, but nest here as well. If you stand quietly, you may be able to see water fowl looking for food on the banks or swimming in the pool. During the winter you can see European coots *(Fulica atra)* or ducks, such as teals *(Anas creca)* and mallards *(Anas platyrhynchos)*. On the banks of the pool in the brush, you can often see spur-winged lapwings *(Hoplopterus spinosus)* walking regally along. From among the reeds, the loud trill of the reed warbler *(Acrocephalus scirpaceus)* can be heard. You may also catch a glimpse of the white-breasted kingfisher *(Halcyon smyrnensis)* perched on a branch, the bright turquoise of its wings standing out from afar.

The Eshel (Tamarisk) Pool

What was the structure used for?

The concrete structure at your feet, built during the British Mandate in the 1930s, served to channel water to the next pumping station. From here the water was diverted to the oil refineries that were built on the banks of the Qishon Stream north of Haifa. A great deal of water is needed to cool the facility's equipment. The wide concrete channel that connects this structure with the main drainage channel led the spring water to the openings of the pumps and from there in a large-diameter pipe to the refineries. At the edge of the picnic grove a short part of this pipe can be seen. Na'aman water continued to be channeled to the oil refineries until the 1960s.

The Zeitzer Pools

Five tiny pools are located next to the reserve offices and the Suphia pool. These pools, which were paved in stone and connected to each other via built channels, are fed at present by the Suphia springs. Today, the pools are separate from the other bodies of water in the reserve, in order to allow an aquatic ecosystem to flourish there independent of the reserve's main body of water.

Who was Zeitzer?

Zeitzer was a pioneer who came to this country from Hungary at the end of the 1920s. The freshwater and the natural pools in the swamp led him to decide to raise fish and so, in 1930, together with a partner, he leased nine hectares of land at the edge of the swamp and dug fish ponds, the remains of which can be seen here. Zeitzer imported carp from Yugoslavia, and despite the obstacles that cropped up on all sides – the fish were swept away to the swamp or were eaten by eels – Zeitzer continued to raise them until his death in 1945. Zeitzer was said to have been a strange character, who would drive his convertible at the dizzying speed of 30 kilometers an hour on the Acre-Haifa road. But he will always be remembered in Israel as a pioneer in commercial fish-breeding.

Tel Afeq

Walk up on the trail to the top of the tell through the pine trees on its western edge. On the way you can see groups of thorny European boxthorn *(Lycium europaeum)* as well as typical Mediterranean scrub land. In the spring the tell is covered in wildflowers, among them anemones *(Anemone coronaria),* cyclamens *(Cyclamen persicum)* and common asphodel *(Asphodelus aestivus)*. During this season, a herd of cattle is permitted to graze the tell area in order to control the open grassland. From the top of the tell is a magnificent view of the Acre Valley. You can orient yourself by looking at the panoramic map.

How was Tel Afeq Created?

In ancient times people chose to settle on sites higher than their surroundings in order better protect themselves. They also chose places that were close to water, had arable land, and were near a main road. Tel Afeq meets all these requirements. The Afeq springs are nearby and it is surrounded by fertile land. It was also close to region's main commercial highway, the Via Maris (the way of the sea), which stretched from Rafiah to Tyre, as well as other roads connecting the coast to the Galilee. Afeq was established on a *kurkar* (calcareous sandstone) ridge about 40 meters above sea level, and extends over about 7 hectares. In the southern part of the tell the governor's house and a shrine (the "acropolis") were built.

The tell got its shape due to the construction of one city on top of the ruins of the previous one. The system of fortifications built on the high part of the natural hill is another important factor contributing to its shape.

What Do We Know About Ancient Afeq?

What's in a Name?

There are a number of cities in Israel called Afeq, which most scholars believe comes from the word *afiq*, meaning water channel. That is probably the reason the name Afeq was given to the Canaanite city near Acre mentioned in the documents cited below. It is common to identify Afeq with Tel Kurdani near the sources of the Na'aman Stream, although scholars are divided on this issue.

The name Afeq first appears in the Egyptian writings of the 19th-18th centuries BCE known as the Execration Texts. These were lists inscribed on clay tablets or human figurines representing kings who were enemies of the Egyptians. The inscriptions were used to curse (execrate) these kings.

The name Afeq is mentioned in the book of Joshua as one of the Canaanite cities the Israelites did not conquer, and which was located in the tribal inheritance of Asher (Josh. 19:30; Judges 1:31). During the period of the united monarchy (around 950 BCE) the area was called the Land of Cabul, and was given by King Solomon to King Hiram of Tyre in thanks for his assistance in the building of the Temple (1 Kings 9:12-13).

During the Crusader period the place was called Kurdana or Rakurdana, which might have its origin in the Arabic word *kurdan*, which means valuable jewel.

The History of the Tell

A number of archaeological surveys have been carried out on Tel Afeq. They have revealed finds going back to the Canaanite period, beginning around 5,000 years ago. A row of large field stones discovered here is apparently a remnant of the most ancient city wall, dating from the Middle Bronze age (the tenth to sixth centuries BCE). During the Canaanite period a purple dye industry developed here, based on excretions from snails harvested from the sea. Glass was also produced here using sand from the beach at Acre and the surrounding area. Both these industries made the area very important economically.

In a salvage dig in May 1998 at the northern edge of the tell, human remains were found, along with pottery vessels and tombs from the Middle and Late Bronze ages (19th-13th centuries BCE).

From the Hellenistic and the Roman periods (the fourth century BCE to the fourth century CE) the remains of a road were found, which led from Acre to the site of Geva Parashim (near Kibbutz Sha'ar Ha'amakim) and from there to Megiddo. A Roman milestone was found along the road.

The first testimony to the existence of a mill near the Na'aman Stream comes from the early Muslim period (the eighth century CE).

During the Crusader period, after the conquest of Acre and Haifa in 1104, the area was divided between the Hospitallers and the Templars. Each order built its own mill and dam, and the entire area became an important farming area. During the second Crusader kingdom, when the capital moved to Acre, the area specialized in the raising of barley and sugar cane. During this period the mill was fortified and a watch tower was built in the northern part of the tell to protect the valuable facility. Remains of the fortifications can be seen near the fig tree at the base of the tell.

Following the fall of the Crusaders, the area was neglected until the 18th century and the rise of the Bedouin ruler of the Galilee, Daher al-Omar. He developed Acre and the surrounding area, renewed farming settlements in the Acre Valley, and the mills of the Na'aman Stream began operating once again. Later, at the end of the 18th century, Ahmed al-Jazzar, the ruler of Acre, restored the mills and expanded them. In a document dating from Napoleon's siege of Acre in 1799, the Kurdani mill is mentioned as a source of food supply to the French army.

At the end of the Ottoman period, the mill and its area belonged to the Sursuk family, who lived in Beirut and leased it to residents of the village of Shfar'am in the Galilee foothills to the southeast. Bedouin of the Ghorna tribe settled on the edge of the swamp at that time.

From the top of the tell, go down via the path to the swamp, and return to the trailhead near the reserve offices.

Educational and Outreach Activities in the En Afeq Reserve

The learning center provides guided tours in Hebrew, Arabic and also in English (by special arrangement) for kindergarten and schoolchildren, as well as for institutions of higher learning, in-service training for teachers, informal education frameworks, and families.

The reserve also serves as a center for biotope studies for high school biology students.

A visit to Tel Afeq is an opportunity for learning in a variety of subjects, including history, Bible, geography, land of Israel studies, ecology, and art.

A visit to the swamp is a learning experience in nature, biology, ecology, technology, art and environmental studies.

Safety Rules and Behavior in the Reserve

Please follow these rules:

- Do not harm flora, fauna, geological, or man-made objects.
- Walk only on marked trails.
- Visits are permitted in the reserve only during opening hours.
- Keep the area clean; discard garbage in the bins provided.
- Entering the water is prohibited!
- Beware of slipping on rainy days!

Opening Hours:

Daylight savings:	8 A.M. to 5 P.M. (last entry 4 P.M.)
Winter:	8 A.M. to 4 P.M. (last entry 3 P.M.)

On Fridays and holiday eves the reserve closes one hour earlier.

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