

Monitoring of Winter Ponds on KKL-JNF Lands

[Seasonal Rain Pools in Israel's Forests
Ecological and Hydrological Monitoring]

Jonathan Bar-Yosef * | Eldad Elron

Consultants, Chief Scientist Unit, KKL-JNF

* yby.eco@gmail.com

Winter ponds (aka seasonal rain pools) are unique ecosystems that exist only during part of the year, particularly in winter and spring. The period when water appears in the pond is called the hydroperiod. In recent years, there has been a growing awareness of the importance of winter ponds as unique habitats that support a wide and partially rare biodiversity that includes insects, invertebrates and amphibians. These animals have adapted to the environment of the ponds' hydroperiod and the seasonal changes in the biotic and abiotic factors of the habitat. Winter ponds are an important component in the landscape of a semi-arid country, providing important ecosystem services. Many of the ponds are located near populated districts and are accessible nature sites, places for leisure, and as infrastructure for promoting research and educational activities for the protection of biodiversity. Moreover, bodies of water in Israel's ecological corridors are important as sources of drinking water for animals and for the benefit of amphibian species transitioning between habitats; needs, which to a great extent, winter ponds provide (Goren and Gazit, 2009). As well, the presence of winter ponds within or near the boundaries of forested areas increases the inherent potential of a forest and its surroundings to provide ecosystem services, in accordance with the overall goal of the new forestry management policy (Asam et al, 2014).

During 2018, an extensive survey was conducted in the KKL-JNF forests throughout the country to locate and identify active winter ponds. The survey included the collection of statutory, geographical, hydrological, botanical and zoological information at 48 sites and enabled the creation of an up-to-date data base of winter ponds and their drainage basins in forested areas and the environs directly affected by them (Elron and Moran, 2018). Concurrent with the survey, the Chief Scientist Unit decided to prioritize moist habitats and initiate a long-term monitoring program at selected winter ponds in forested areas. The program will continuously analyze the ponds' hydrological, chemical and biological statuses in order to improve professional recommendations for interface activities implemented by region managers and on-site foresters, in the interest of ensuring accuracy. The choice of the winter ponds for the monitoring program was determined mainly by their statutory status, i.e., their presence within KKL-JNF forested areas and their eco-hydrological status, i.e., their potential for conservation and restoration. In order to avoid duplication, winter ponds in the jurisdiction of the Israel Nature and Parks Authority, which also conducts ecological monitoring, were not included.

During 2020, the long-term winter pond monitoring program was launched in KKL-JNF's lands. From the 48 ponds

mapped in the 2018 survey, about 30 were selected, most in the northern coastal plain, the Galilee and the Golan Heights, and some in the country's southern district. It was decided that monitoring three times during the hydroperiod, once every three years, would provide a reliable and representative report of the winter ponds' functioning. The seasonal pools monitored during the first year (2020) included 6 in the Golan: Tzurman, Al-Mughayyir, Nafah, Katsavia, Aniam and B'juria (Fig. 1), and 6 in the Western Galilee: Matzuva (3), Hanita (2), and Har Gamal; a total of 12 winter ponds, this year.

Because the winter of 2019–2020 was particularly rainy, the hydroperiod of most of the ponds was relatively long. In hot or even average years, a pond with hydraulic malfunctioning may not fill with water or be filled for a short time. Considering the amount of precipitation, some of the ponds with very short hydroperiods included the Hanita Nof and Matzuva winter ponds. The hydroperiod of the ponds in the Golan was longer and greater in biodiversity of flora and fauna; i.e., the habitats were more stable and functional (Fig. 2). The reasons for the richness of the ponds'

aquatic invertebrates are varied and beyond the longer hydroperiod. The ponds' size, their many ecological niches, hydrophilic vegetation and age are also contributing factors. Winter ponds in the Western Galilee need various interface interventions to improve their function, such as sealing the bottom of the pond to reduce infiltration; arranging drainage, which is sometimes obstructed by roads or canals; and deepening others.

Some of the unique and interesting discoveries made during the first year of monitoring: The Al-Mughayyir pond served as a breeding site for five different species of amphibian, including *Triturus vittatus*, and *Pelobates syriacus*, a species of toad considered critically endangered. As well, a freshwater sponge of the genus *Ephydatia* was found on pond rocks. This finding is rare and unusual in Israel, and a similar finding was made in only one pond in the Golan Heights [information provided by Liron Goren]. Larvae of a species of golden beetle, *Dytiscus circumflexus*, was found in the Nafah winter pond. This species belongs to the largest group of water beetles, previously common in Israel, which have disappeared in other parts of the country.



Figure 1

B'juria Pond, January 2020

Photo: Jonathan Bar-Yosef

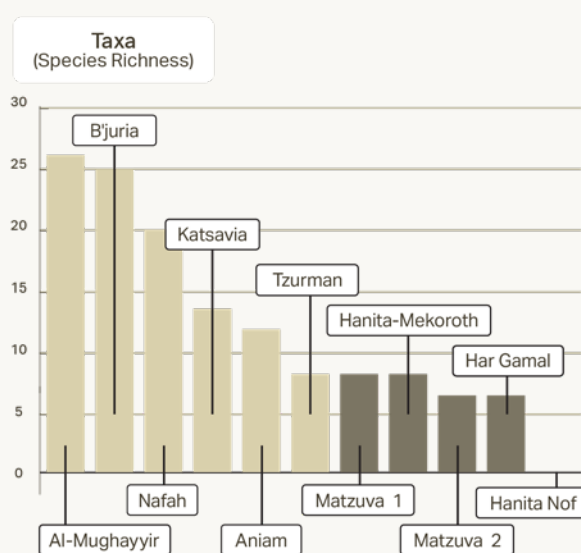


Figure 2

Samples from the 2020 monitoring in the Western Galilee and the Golan Heights indicate the richness of the aquatic invertebrates in selected winter ponds. No aquatic invertebrates were found in the Hanita Nof pond.

The pond at B'juria is a habitat for the largest and richest species of hydrophilic plants and aquatic invertebrates in Israel. Indeed, the southern banded newt (*Ommatotriton vittatus*), a species of salamander that had not been seen in the pond for the past twenty years, was recently detected there. The Har Gamal, Hanita, and Matzuva winter ponds, which KKL-JNF constructed in the 1990s, are inhabited by crustaceans unique to winter ponds; a finding that indicates their success in supporting natural population growth.

An important feature of the KKL-JNF monitoring program is its efficiency in transferring the relevant information from the Chief Scientist Unit to the personnel in the field for implementation. Improvement of the twelve ponds' eco-hydrological function and the repair of various other defects have already begun (2021) in preparation for the next round of monitoring, expected to take place in 2023.

References

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Southern banded newt (*Ommatotriton vittatus*),
B'juria Winter Pond, Golan Heights
January 2020
Photo: Eldad Elron



Purple heron (*Ardea purpurea*),
B'juria Winter Pond, Golan Heights
January 2020
Photo: Asaf Meroz



Har Gamal Winter Pond
January 2020
Photo: Jonathan Bar-Yosef



Nafah Winter Pond
January 2002
Photo: Jonathan Bar-Yosef