

Howland Forest

Site name: Howland Forest (candidate core)

Domain: Northeast

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Web page: <http://howlandforest.org>

Location: 45.204022 N, 68.74021 W (central Maine)

The Howland Research Forest is located in the northern part of the Northeast NEON domain, and consists of both wild (unmanaged) and commercially managed coniferous forest. It is one of the founding AmeriFlux sites with 4 flux towers presently in operation. The spruce-hemlock-fir forest is at the ecotone between the northern boreal forest and temperate hardwoods. The Howland site is representative of forests in the northern part of the Northeast, and the southeastern (Acadian) boreal forest.

It was established in 1986 as part of a Forest Service funded Spruce-Fir Cooperative with then landowner, International Paper, to monitor the impact of pollutant deposition on forest health. The central wildland forest (~300 ha) has been minimally disturbed and consists of canopy trees with a median age of 140 years (some trees in excess of 300 years old). The land has never been plowed or cleared and the forest features a pit and mound topography with abundant coarse woody debris. Stands are dense (basal area >50 m² ha⁻¹). Two flux towers with AC power (Howland-Main, since 1995 and Howland-Nitrogen, since 1999) are located in this core area.

Commercial forestry operations are carried out in the spruce-hemlock-fir forest surrounding the central core. These include past clearcuts and strip-cuts as well as ongoing shelterwood harvests. A unique aspect of Howland is the location of additional flux towers in similar forest that has then been experimentally manipulated. The main tower acts as a “control” for these experimental treatments; the first was begun in 1999 and is a study of how nitrogen deposition influences forest C cycling and storage, and the second begun in 2001 investigates the consequences of commercial forestry activities (shelterwood harvest) on forest carbon. These towers are located 0.8 and 1.2 km from the original site. A fourth flux tower was installed in 2005 in an area clear-cut in 1984. All flux systems use the closed-path approach and are connected by wireless ethernet to the main base and via satellite to the Internet. Each tower also contains meteorological instruments connected to dataloggers that are also connected to the wireless system. The main base is a climate controlled building 50m from the main tower with 300-amp electrical service but no running water. The main tower is a 100 ft walk-up tower, and the other towers are 60-100 ft triangular masts.

Howland has been a NASA core EOS land validation site for the MODIS and AERONET programs. The Howland site was part of the 1.1 million acres sold by International Paper Company in 2005 to GMO Renewable Resources, LLC, (GMORR), a private forest investment management company.