

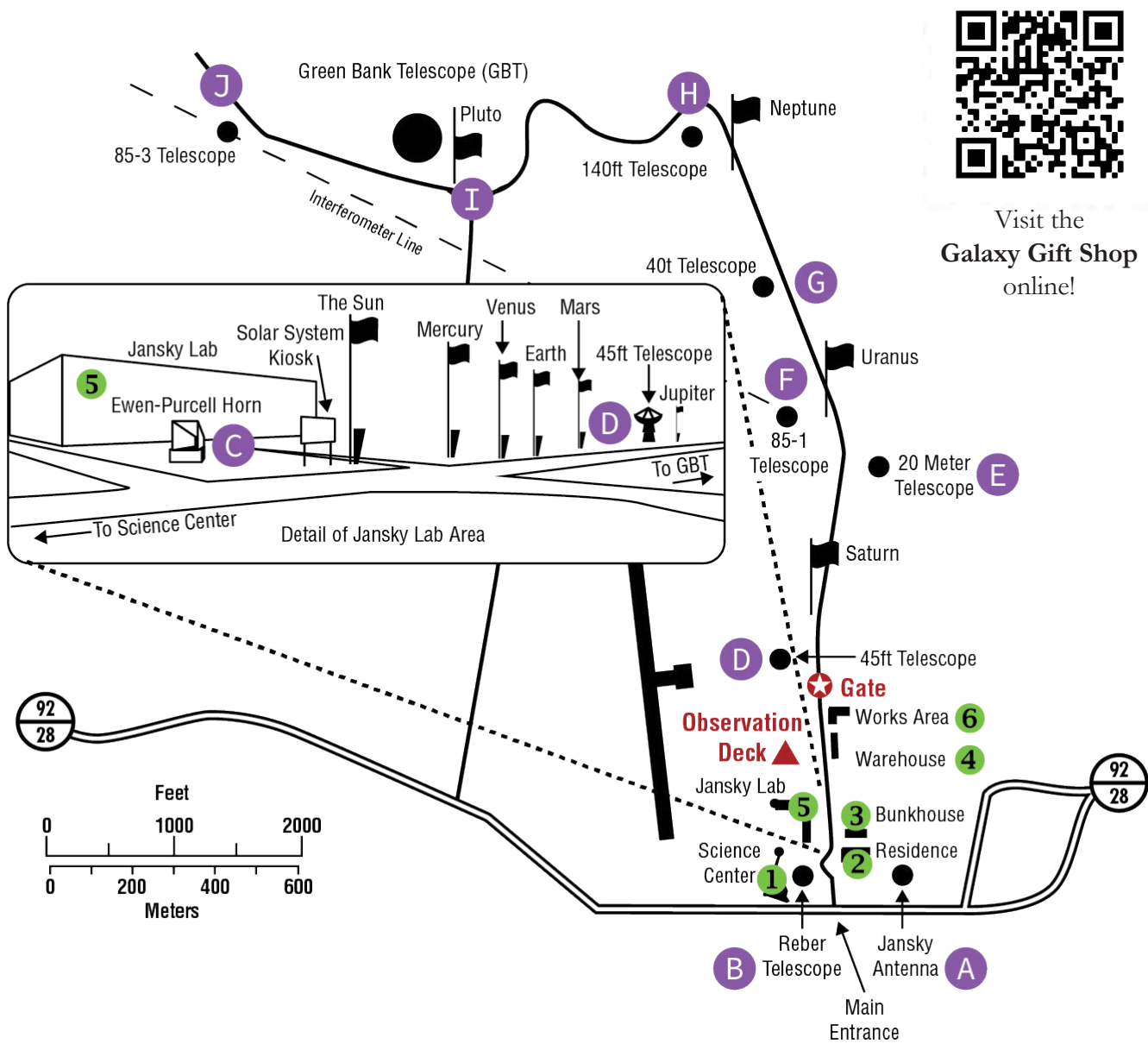


SELF-GUIDED WALKING TOUR & SITE MAP

The Self-guided walking tour may be taken anytime before dark. Visitors are welcome to walk their dogs or ride bicycles around the grounds. We request that once you pass the gate, shown in **red** with a star (★), be certain that all electronics not vital to your health are completely turned off.

Telescopes - both active and inactive - are marked in purple letters. Points of interest are marked in green numbers. The best location to take pictures of the Green Bank Telescope is our Observation Deck, indicated by a triangle (▲), near the parking lot behind the Jansky Lab (5).

A scale model of the solar system begins with the Sun in front of the Jansky Lab (5) and ends 1.5 miles away at Pluto, next to the Green Bank Telescope (I). This Scale model is 1 foot to 3 billion feet. The kiosk at the Sun flag provides more information.



Visit the **Galaxy Gift Shop** online!

The Green Bank Science Center (1) is open year-round and serves over 45,000 visitors a year. The 25,000 square foot facility contains the Catching the Wave Exhibit Hall, a 150-seat auditorium, classrooms, a gift shop, and a full menu at the Starlight Café.



Green Bank has two short-term housing buildings. The Residence Hall (2) is used for visiting scientists, while the Bunk House (3) is often used for students participating in educational programs. Part of the Warehouse (4) was our original tour center, but now hosts Observatory and community events.



Sensitive receivers and state-of-the-art data collection systems are invented and designed in the Jansky Lab (5). The parts are fabricated and assembled in the Works Area (6) before being transported to the telescopes for use.



The Jansky Antenna (A) is an exact replica of the antenna used by Karl Jansky in the early 1930s. With it, he found three sources of radio static: two were caused by thunderstorms, but he concluded that the third was coming from the Milky Way! After hearing of Jansky's cosmic static, radio engineer Grote Reber was determined to investigate. He built the Reber Telescope (B) himself. It was the first dish-shaped radio telescope, and its success revolutionized radio astronomy!



After the Second World War, radio astronomy took off due to newly-improved receiver technology. In 1951, Howard Ewen and Edward Purcell from Harvard University built the Ewen-Purcell Horn (C) and pointed it out of their lab window. Because of its shape, excessive rain caused it to flood their lab multiple times, and was a popular target for undergrads' snowballs. Eventually, they used it to discover the first hydrogen line emission at 1,420.4 MHz, revealing the spiral shape of the Milky Way. Today, scientists still use hydrogen line emission to investigate galaxies.



The 45-Foot Telescope (D) was designed to be mobile, and was moved around West Virginia to be the fourth telescope in the Green Bank Interferometer (GBI). In 1974, it aided the discovery of Sagittarius A*, the black hole in the center of our galaxy. It then did satellite tracking for a project with NASA and



the Japanese space institute. From 2004 to 2012, it was the Green Bank Solar Radio Burst Spectrometer, which studied the Sun at radio wavelengths. Though still in working order, it awaits funding and a new project to continue its work.

Designed and built by the US Naval Observatory, the 20-Meter Telescope (E) was built to measure highly accurate time, continental drift, and the Earth's wobble, or "precession." Now it is a part of the Skynet Robotoc Telescope Network, and is used by youth groups, educators, and undergraduates. Skynet is led by the University of North Carolina at Chapel Hill.



The Tatel Telescope (F) is the oldest telescope on site and saw extensive use from from 1959 until 2000. It was first used by Frank Drake to launch the Search for Extraterrestrial Intelligence (SETI) in 1960. Although Drake found no signals from extraterrestrials, SETI investigations continue today using the techniques established by Drake. The Tatel was also one of the telescopes that was part of the Green Bank Interferometer.

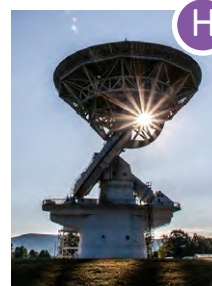


The 40-Foot Telescope (G) telescope was built in 1962 to determine if the intensity of radio sources varied over time. It was also the first fully automated radio telescope. The telescope is now used by teachers and students from across the country to observe the universe and experience research first-hand. It is the only remaining onsite telescope with a mesh dish and a separate control room, all other telescopes on site are controlled from



the Jansky Lab.

The 140-Foot Telescope (H) was completed in 1965 and is the largest equatorially mounted telescope in the world. It was the first telescope to detect complex molecules and neutral hydrogen absorption from another galaxy. Until Spring, 2019, it was part of the international Radioastronomy



project that tracked a Russian orbiting satellite called Spektr-R. The satellite works with radio telescopes on Earth to expand our knowledge of black holes, interstellar plasma, pulsars, and other radio emitting objects in the universe.

Observatory staff designed the largest fully steerable telescope in the world. Named after the West Virginia senator who advocated for its construction, the Robert C. Byrd Green Bank Telescope (GBT) (I) is an offset-parabolic dish 100x110 meters in diameter. GBT's feed arm rises above the dish to support sensitive receivers. Its placement on the side of the dish is unique, and ensures that it is not in the way of incoming radio waves. The surface can be actively monitored and adjusted in response to temperature and gravitational changes to maintain a perfect surface and provide optimal data.



The 85-3 and the Green Bank Interferometer (J). Operational until 2000, the 85-3's final job was a long-term research project to monitor 35 pulsars every day. Alongside the 85-2, the Tatel Telescope, and the 45-Foot Telescope, it was part of the Green Bank Interferometer, or GBI. The dishes operated simultaneously to simulate a larger telescope, about a mile in diameter, with much higher resolution. The GBI was the prototype for interferometer systems like the Very Large Array (VLA) in New Mexico and the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile.



Green Bank Observatory is supported by the National Science Foundation and is operated by Associated Universities, Inc.



RFI GUIDELINES

All electronic devices give off radio frequency interference, or RFI. Just like you can't see the stars when the Sun is out, radio telescopes cannot detect distant objects when an electronic device is on nearby. Even if your cell phone were in orbit around Saturn, it would be the brightest object in the sky to the Green Bank Telescope.

For this reason, we ask you turn all electronic devices **completely off** (not just in airplane mode!) once you cross into the RFI Restriction zone (marked in **red** on the Trail Guide). If you cannot turn off your device*, please leave it in your vehicle.

This policy includes:

- ★ Cell phones and MP3 players
- ★ Bluetooth devices, including headphones, earbuds, and smart shoes
- ★ Smart watches and fitness trackers
- ★ Segways, motorized bikes, etc.

**Medical devices, like pacemakers, hearing aids, and insulin pumps, do not have to be turned off.*



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Visit us at greenbankobservatory.org,
and follow us on these social media platforms:



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GREEN BANK OBSERVATORY AND SCIENCE CENTER

SITE TRAILS

SAFETY TIPS

- ★ Tell someone when to expect you back.
- ★ Travel in groups, and be aware of your surroundings.
- ★ Look up when the Sun will set, and plan to be finished before dark.
- ★ Know your abilities, and respect your body's limitations.
- ★ Always keep your pets on a leash.
- ★ **Under no circumstances should you approach any wildlife.** If you do not know how to deal with native bears or snakes, please ask the front desk for a safety brochure.
- ★ Never eat any plants you find! Especially stay away from these, which can irritate your skin:



ANY mushrooms



Poison hemlock



Poison ivy



Poison oak



Poison sumac



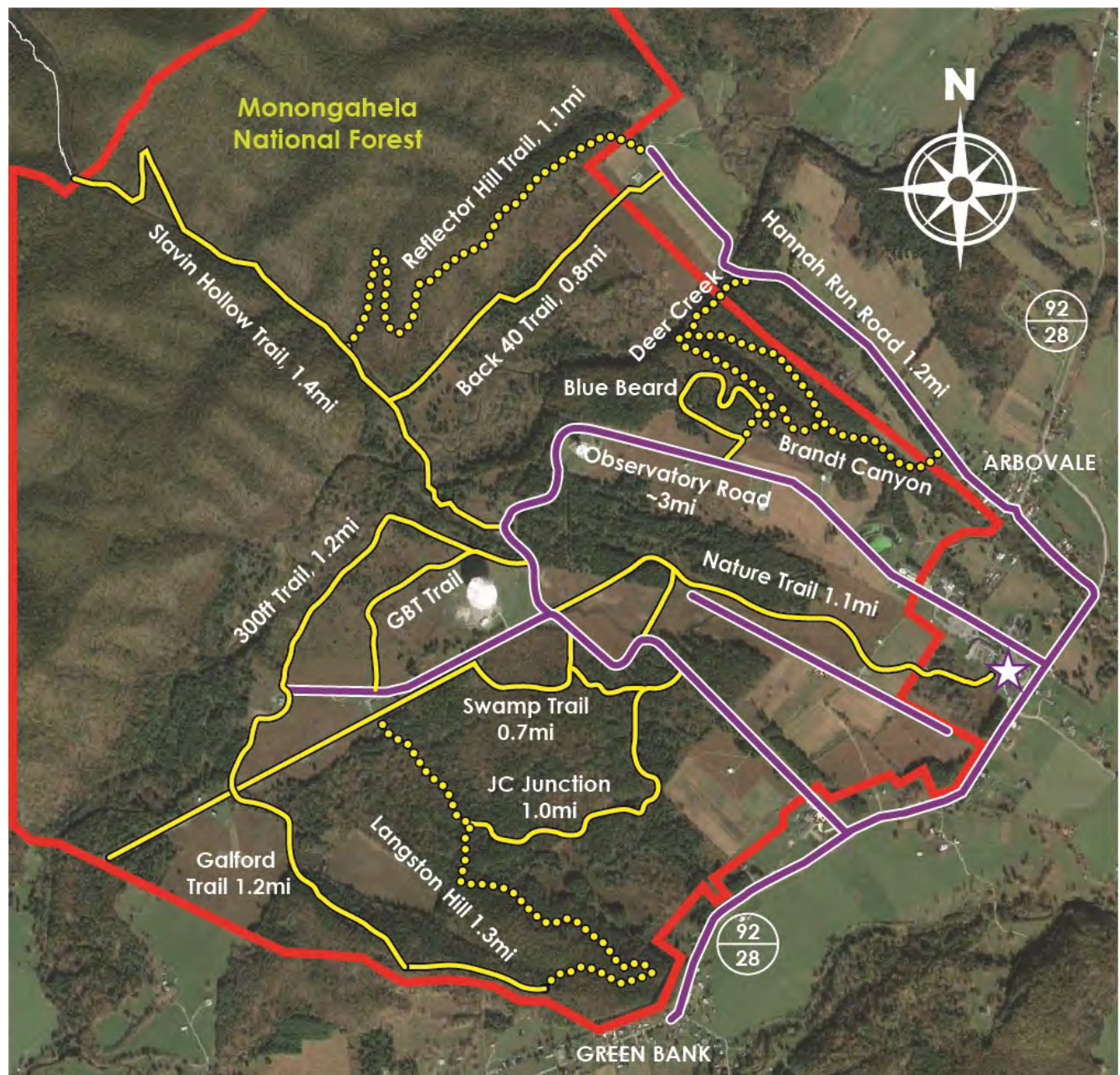
Stinging nettle



Water hemlock



White baneberry



Yellow: Gravel or dirt track

Purple: Paved road

Red: RFI Restriction Zone boundary

Dotted lines: advanced/expert trails.

Solid lines: beginner/intermediate trails.

White star: Science Center. Potable water, food, ATM, and phones available.

A color-blind-friendly version of this brochure is available.

Map courtesy of Google Earth.