

High-Tech Bushwhacking IN THE 21ST CENTURY

BY NEIL F. WOODWORTH



Computers, software, and technology have changed nearly everything that we do today. **Wilderness route-finding is no exception.**

I learned to find my way in the woods off trail as a Boy Scout. I was taught to use a magnetic compass with paper United States Geological Survey (USGS) 7.5- and 15-minute quadrangles. As a boy, I expanded my horizon for adventure one quadrangle at a time with purchases from the local stationery store, the USGS dealer in my hometown.

IN THOSE DAYS the Adirondack Park was mostly covered by 1:62,500-scale, 15-minute maps with the perimeter of the park available in 1:24,000-scale, 7.5-minute quadrangles. These paper maps, when competently used with a magnetic compass, guided me on many adventures, leading me to off-the-beaten-path ponds or trailless summits. My favorite spots seemed to be the very points where four 7.5-minute quadrangles converged, or the tricky place where I walked off a 1:24,000 quad into territory mapped only with a 15-minute, 1:62,500-scale topographic map.

A NEW KIND OF MAP ▶ Today, every USGS topographic map, in its most updated version, is available to you for free with just a few clicks of a mouse using your computer and the Internet. Microsoft operates a topographic map database called the Microsoft Terraserver. You can visit the Terraserver directly at <http://teraserver-usa.org>, or access its maps easily using a free software program called USAPhotoMap available at www.jdmcox.com.

This handy little program allows you to search every 7.5-minute quadrangle in the nation using place names or USGS landmarks such as Hunter Mountain in the Catskills or Hurricane Mountain in the Adirondacks. You can use USAPhotoMap to display the same area depicted in the digital topographic map as an aerial photograph. You can also search by latitude and longitude. And you can create and transfer waypoints, tracks, and routes to and from most popular GPS receivers.

INTRODUCING TOPO! ▶

My favorite software program for creating bushwhack routes is National Geographic's TOPO! State Series. For adventuring in the Adirondacks, Catskills, and anywhere else in New York and New Jersey, \$100 gets you scanned versions of every USGS topographic map, including those in three scales: 1:24,000, 1:150,000, and 1:250,000. You can magnify a 7.5-minute quadrangle up to four times for easy waypoint positioning. The program has a built-in road and street name feature that places the correct location and names of all roads as an overlay to the topographic map. This is a very handy feature for navigating to that hard-to-find trailhead on unfamiliar local roads.

You can use TOPO! to plan a route, place the waypoints that comprise your desired bushwhack, and determine the length, elevation, and distance of your route. You can transfer the route and waypoints to your GPS receiver easily. After your trip, you can download your actual track of travel from your GPS and display it on TOPO! You can also create a printed map in color. For a durable, field-use-friendly map, I print from the TOPO! software to a sheet of National Geographic High Adventure paper using a color inkjet printer.

TOPO! helps keep your topographic maps, roads, and streets updated with a free, built-in update service via the internet. TOPO! seamlessly reconciles differing map scales and map edges. The dreaded map corners of differing-scale paper quadrangles become a thing of the past.

One thing that you cannot do with National Geographic TOPO! is upload the TOPO! topographic maps into a Garmin GPS receiver for display. You can, however, use TOPO!-generated routes and waypoints with the proprietary Garmin MapSource TOPO US 2008 and Garmin 1:24,000 scale National Parks–East mapping software. These Garmin products do provide topographic maps for uploading and display on your GPS receiver. Since the latter were prepared using USGS maps, I have found that waypoints and routes created in TOPO! and transferred to my Garmin receiver display with more than sufficient accuracy for bushwhacking.

The Garmin National Parks–East product provides 1:24,000-scale maps for the entire Adirondack Park for upload and display on a Garmin GPS receiver. Another Garmin Mapsource product, Topo U.S. 2008, provides digital topographic maps for display on your GPS at 1:100,000 scale, including contours, water bodies, and elevations for all fifty states.

In order to ensure the correct positioning and display of your waypoints and routes on your GPS receiver, you need to keep a couple of points in mind:

*The scale for the National Geographic TOPO! maps for the Adirondack Park is 1:24,000, the same scale used for the Garmin MapSource National Parks–East mapping software which includes topographic-style maps for the whole Adirondack Park.

*You also need to ensure that the map datum or map coordinate reference setting is the same. Regardless of the mapping software that you use with your GPS receiver, the datum used on the map must match the datum selection of your GPS unit. Most paper topographic maps use a NAD 27 datum, whereas the default for most GPS receivers and digital mapping software like TOPO! is the NGS 84 datum. It is easy to change the datum selection on your GPS receiver. A datum mismatch can result in a position error of several football fields' length or more in the woods.

GEARING UP ▶ The most frequent question asked of me is, “Which GPS receiver should I purchase?” The answer depends on how you plan to use the GPS unit. (A word about brands: this article is based on my own experiences with GPS receivers and mapping software. I have selected products for discussion that have performed best for me in the woods and on the water.)

For bushwhacking and off-trail use, I recommend either the Garmin GPSMap 60CSx or 76CSx receiver unit. The 76CSx unit differs from the 60CSx unit in that it has a larger internal memory and it floats. Otherwise, the units are identical. Each uses the high-sensitivity SIRFStar III receiver chip, a feature that makes these units highly accurate and, in my experience, eliminates GPS

signal loss under heavy, wet, or snow-covered foliage.

Both of these units have a built in digital compass, a very useful feature.

**USAPhotoMap allows
you to search every
7.5-minute quadrangle
in the nation using
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USGS landmarks**

SHOWN BELOW IS THE GPS RECEIVER, A MAP PRINTED FROM A LAPTOP, A DECLINATION COMPASS, AND THE HOLSTER ATTACHED TO THE BACKPACK STRAPS.

PHOTOGRAPH BY JOHN KETTLEWELL



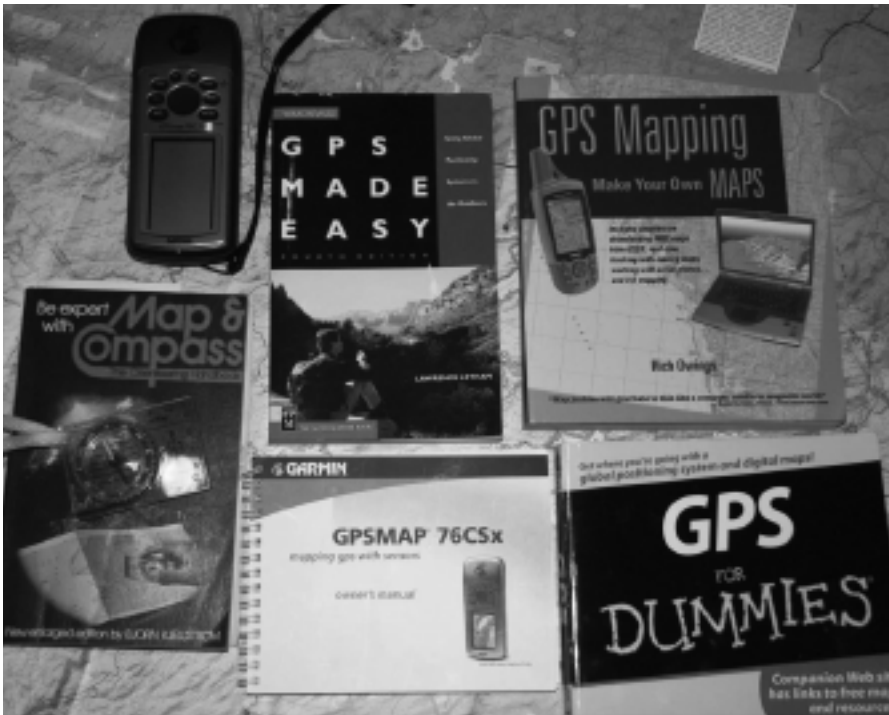
The dreaded map corners of differing-scale paper quadrangles are a thing of the past

LEFT: SOME HELPFUL RESOURCES IN GETTING STARTED WITH YOUR GPS

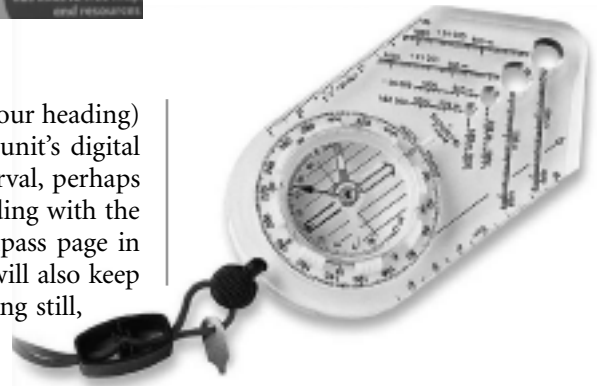
BELOW: AN ADJUSTABLE DECLINATION COMPASS

BOTTOM: MAP OF HEART LAKE DISPLAYED ON A GARMIN 76CSX

PHOTOGRAPHS BY NEIL WOODWORTH



Your GPS receiver cannot tell you which direction you are facing (your heading) when you are standing still. The solution is configuring the GPS unit's digital compass to "power on" after you are stopped for a brief time interval, perhaps thirty seconds. Then, the electronic compass will display your heading with the black arrow on the map display and numeric display on the compass page in relation to your bearing to your destination. The digital compass will also keep the GPS unit's map display correctly oriented while you are standing still, pondering your next move. As soon as you begin walking again, the GPS function replaces the electronic compass.



PREPARING FOR YOUR BUSHWHACK

I use National Geographic TOPO! to locate and display the USGS topographic map area covering my intended bushwhack. Using the waypoint tool, I place waypoints at intervals along my route to my destination, in this illustration a trailless summit in the Wilcox Lake Wild Forest. I position the waypoints to create the most direct route that avoids wetlands and false summits. When I have my route and waypoints completed, I print out a copy of the topographic map with the waypoints and route displayed. The map goes into a plastic map case with a neck lanyard.

Next, I connect my GPS 76CSx to my computer using its USB cord and use TOPO! Upload tool to place the waypoints and route in the internal memory of the GPS unit. I make sure that I have used the Garmin Mapsource product, National Park-East software, to upload the necessary 1:24000-scale topographic maps to my GPS receiver. Now, my GPS unit will correctly display my waypoints on the uploaded topographic maps in the field. As a failsafe against GPS malfunction, I plot the correct magnetic compass bearings for my route using a paper USGS map that I have properly oriented just as I did in the days before the introduction of reliable GPS handheld units.

When you upload the Mapsource topographic display

maps, you also transfer a great deal of geographic information to your GPS receiver. When you press the FIND button, you get an option to search for your uploaded waypoints, routes, or nearby geographic features such as



summits, lakes, ponds, or trails that are known in GPS lingo as points of interest, or POIs. You can select to navigate from waypoint to waypoint or directly to a lake or mountain summit using POIs. Now, I am ready to hike the Wilcox Lake bushwhack.

I use the GPS unit's FIND feature to locate the first waypoint and the compass bearing to it. Both my GPS unit and magnetic baseplate compass have been adjusted for magnetic declination, so the GPS-generated bearings can be accurately followed to the first waypoint using the magnetic baseplate compass. The GPS unit will continuously generate corrected bearings as I walk the course to the first waypoint. The GPS unit will also display changes in the distance to that waypoint as I walk and will sound a tone when I arrive at that waypoint. I then repeat the steps to the next waypoint until I reach the destination. The GPS unit continually updates the course to the next waypoint as I detour around beaver flows, cliffs, or heavy blowdown.

The GPS receiver's navigation display indicates your speed, course, and distance to the destination as well as the estimated time of arrival at your current rate of advance. The map display typically reveals your current location and heading as well as the waypoints and route to your destination.

I carry the GPS receiver in a homemade holster secured to the shoulder strap of my daypack with Velcro straps, leaving my hands free while giving the GPS receiver's antenna clear access to the sky. I can reach it easily for position and bearing checks. My compass and map case with the printed paper map are on lanyards around my neck.

If you follow these suggestions, you are ready. Good bushwhacking to you!

◆ Neil Woodworth is ADK's executive director; he wrote "GPS and Me: Some Tips for the Timid, From Somewhat of a Luddite" in the May/June 2006 Adirondac.

ACCESS

Terraserver: <http://teraserver-usa.org>

USAPhotoMap: www.jdmcox.com

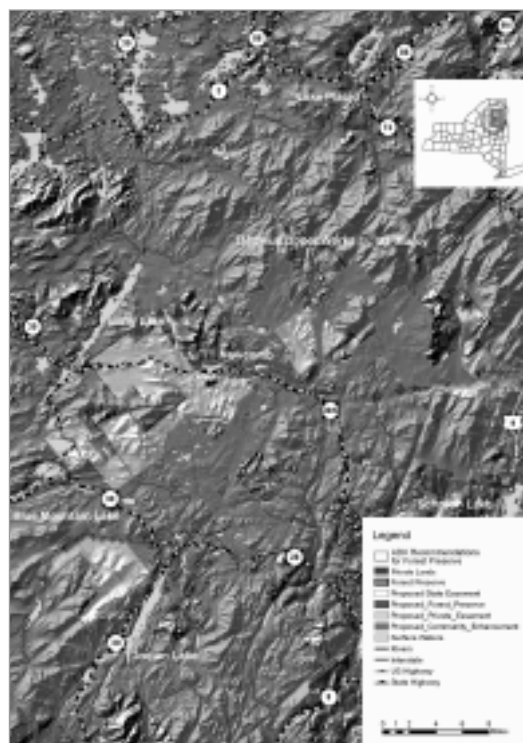
Software for bushwhacking: National Geographic's TOPO! State Series

ADK MAPS FOR THE FUTURE ► ADK's traditional hiking maps, included with many guidebooks, have been created using traditional photographic methods. These maps are based on U.S. Geological Survey (USGS) topographic maps, and in many cases are based on older editions of maps created prior to the GPS era. The reason for this is that, in many cases, older maps provided greater contour line detail than is available on newer editions.

However, with the advent of GPS, satellite mapping, and Geographic Information Systems (GIS), more and greater detail is available to mapmakers. The central feature of ADK's Forest Preserve Project, led by Stuart Mesinger, was the creation of a new GIS database covering both the Catskill and Adirondack Forest Preserves. This database includes information gathered from a wide variety of sources: New York State government maps of various sorts, USGS maps, satellite photos, tax records and tax maps, watershed maps, and much more.

Eventually, ADK intends to employ this GIS system to create new and better trail maps that will not only be accurate, but also easier to view, and much easier to update as new information becomes available. Mapmakers will be able to adjust scales seamlessly to get the best compromise between size and detail. Colors can be selected and used to improve readability. Layers of information can be turned on and off as needed. This complete digitization of map information will allow ADK to create custom maps that will meet the needs of hikers, paddlers, skiers, and snowshoers better than ever before.

—John J. Kettlewell



FINCH, PRUYN'S LAND MAP FROM ADK GIS SYSTEM