

Monitoring Conservation Easements and Preserve Lands with GPS and GIS Technology



PROJECT: Monitoring Conservation Easements and Preserve Lands Along Western Penobscot Bay with GPS and GIS Technology

PROJECT DATE: June 2010

The Western Penobscot Bay region of Maine is one of the most scenic areas in the Northeast United States and continues to be a favorite destination for travelers during the summer tourist season. With abundant water resources and forestland, the region is a natural haven for a wide variety of wildlife species, including eagles, seals, nesting sea birds, dolphins, and more. Coastal Mountains Land Trust has been working to permanently conserve land to benefit the natural and human communities in fifteen towns in this region since 1986.

Over the past 24 years, the Land Trust has worked cooperatively with landowners to conserve more than 8,000 acres (3,237 hectares) of land in the region. As a result of its efforts, the organization now manages 58 individual preserves which are all open to public access, and monitors 53 conservation easements that sustain agricultural, forestry, scenic, and wildlife resources. Additionally, the organization manages more than 23 miles (37 km) of wild, scenic trails on the properties it protects. As the organization has grown, so too have its environmental stewardship and management responsibilities. Thanks to donations from the Norcross Wildlife Foundation and Trimble, Coastal Mountains Land Trust recently obtained a Trimble® GeoXM™ handheld with integrated GPS, as well as Trimble TerraSync™ Professional and Trimble GPS Pathfinder® Office software to better manage and maintain data about its properties.

"Maintaining a stewardship GIS database is now a key part of the work we do because having accurate data informs our management decisions," said Ian Stewart, stewardship director at Coastal Mountains Land Trust. "We're extremely grateful to the Norcross Wildlife Foundation for donating the hardware and to Trimble for donating the software that allows our organization to be more efficient and impactful."

Whether for collecting data on new land acquisitions or for maintaining existing properties, the GeoXM handheld allows staff to accurately map and maintain the spatial information needed for informed decision-making.

"When we first received the GeoXM handheld, we loaded it with GIS shape files,

some of which we had in our existing GIS database and some of which we acquired from the state," said Stewart. "This put detailed location information about rivers, streams, contours, parcel boundaries, and other landmarks right in the palm of our hand."

The GeoXM handheld came equipped with TerraSync software for quick and easy data collection and was also loaded with aerial photos of the region, which Coastal Mountains Land Trust obtained from the state of Maine. Now, when the Land Trust acquires new land, such as the recent purchase of a 92-acre (37 hectares) preserve in Belfast, Maine, staff members use the GeoXM handheld to develop the baseline documentation necessary to plan for the property's future stewardship.

"When we first get a new piece of land, we take thorough notes so we can carefully monitor the state of the land over time," said Stewart. "We start by visiting the property with the Trimble GPS handheld to mark its boundaries, take photos, geolocate the photographic points and take note of streams, weeds, animal habitats, and other land features."

Back in the office, the data is imported into GPS Pathfinder Office software for postprocessing. GPS Pathfinder Office software's powerful GNSS postprocessing capabilities ensure that the data is reliable, consistent and accurate within one to three meters.

Once the postprocessing work is complete, GPS Pathfinder Office is used to export the data as a shapefile so that it can be edited, analyzed, and maintained in ESRI's ArcView GIS software.

In addition to using Trimble's mapping and GIS solutions to collect and manage data about newly acquired land, it is also a key component of the organization's stewardship program for existing land. Specifically, the Trimble GeoXM handheld is used for:

- **Ecological inventory studies:** Volunteers or hired ecologists utilize the GeoXM handheld to complete detailed inventories of Coastal Mountains Land Trust's land preserves. This includes collecting data

PROJECT HIGHLIGHTS

- GPS and GIS technology helps conservation organization manage land preserves, easements, and trails while increasing environmental stewardship
- Trimble mapping and GIS solutions selected because of rugged handheld computer technology with all-day battery life and easy to use software for internal staff
- Field team saves time and money using Trimble GeoXM handhelds with TerraSync software to accurately map more than 8,000 acres (3237 hectares) of protected land
- Technology donated by Trimble and Norcross Wildlife Foundation

THE EQUIPMENT USED ON THIS PROJECT INCLUDES

- GeoXM handheld
- TerraSync software
- GPS Pathfinder Office software

NORTH & SOUTH AMERICA
Trimble Navigation Limited
10355 Westmoor Drive
Suite #100
Westminster, CO 80021
USA
+1-720-587-4574 Phone
+1-720-587-4878 Fax

EUROPE & AFRICA
Trimble Germany GmbH
Am Prime Parc 11
65479 Raunheim
GERMANY
+49-6142-2100-0 Phone
+49-6142-2100-550 Fax

ASIA-PACIFIC & MIDDLE EAST
Trimble Navigation
Singapore PTE Limited
80 Marine Parade Road
#22-06 Parkway Parade
Singapore, 449269
SINGAPORE
+65-6348-2212 Phone
+65-6348-2232 Fax



www.trimble.com

about sensitive areas that need to be restored, such as a road that has been washed out or where erosion is problematic. Other data collected is used to create maps of different types of communities on each property, such as wetlands, pine forests, or grasslands.

- **Management plan development:** The Land Trust is creating a five-year plan for each of its properties based on the data collected in the field. This includes trail development, ecological development, and restoration. According to Stewart, having a five-year plan for each property enables the organization to better manage its properties and its workload, as well as helping bolster public support and fundraising.
- **Public access management:** Spatially accurate information is an important part of long-term public access planning. The Land Trust staff relies on accurate information collected in the field and stored in the GIS to determine where to build bridges, implement landscaping to prevent erosion or clear debris from roads and public access points.
- **Trail development:** The Land Trust is continually building and maintaining hiking, biking, and scenic trails on its land. Each existing trail has been mapped using the GeoXM handheld, which makes it easy to see where trails intersect and where they are in proximity to boundaries or natural habitats. Having trail data managed in the GIS also helps with trail maintenance and planning.
- **Boundary maintenance and monitoring:** Aerial photos and parcel data in the GIS database that can be loaded onto the GeoXM handheld are instrumental in helping Coastal Mountains Land Trust monitor and maintain boundaries between their land and neighboring properties.
- **Habitat management:** Managing the natural habitats of local plant and animal species is another important responsibility of the Land Trust. On one preserve, for example, more than a third of the land is protected as open space for grassland birds. Land Trust staff members use the GeoXM handheld to map a rotational mowing cycle of this preserve to help protect the birds' natural habitat. At another site, staff members have mapped more than 25 stands of invasive plants, which they use to properly manage weed control.



“From getting new land into our system to managing our stewardship program for existing land, having access to GPS and GIS technology is without a doubt making us a better organization,” said Stewart. “We simply couldn’t do many of the things we’re able to do today—linking photos to geographic points in a database, mapping trails, implementing long-term, spatially accurate plans—without the Trimble hardware and software.”

According to Stewart, the Land Trust is able to save money by using Trimble’s mapping and GIS solutions to complete tasks internally that would otherwise have to be contracted out at a higher cost, such as surveying and drafting legal documentation about deeds and boundaries. Moreover, Stewart also estimates the organization is able to complete much of its field work in half the time because having a complete GIS database allows workers to navigate to a specific location, and once at the site basic data collection and orienteering becomes much easier.

“We will definitely be using GPS and GIS technology into the future,” said Stewart. “I’m sure there are features and benefits of the Trimble handheld that we aren’t taking full advantage of yet. Our goal is to continue to find new ways to use this technology and to continually be more proactive at managing our land and our GIS database.”

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE