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New Technology in Forestry: Are You Ready?

BY ERIC GAKSTATTER

In the early 1990s, I recall being tasked with training a group of foresters on how to use a new-fangled handheld data collector the company I worked for had developed, along with various pieces of software on it for traversing, timber cruising, vegetation surveys, profiling, etc. Being fairly young and somewhat inexperienced, I didn't fully understand the challenge of trying to convince a group of seasoned foresters to put away their pencils and "Rite in the Rain" tally cards and pick up an electronic gizmo in which they punched in their cruise plot info, traverse bearings and various other pieces of field data. Of course, being involved in the development of the new-fangled handheld data collector, I thought it was the best thing since sliced bread. Who could deny the value of error-checking to check for typos, graphic plot of traverses, and no transcribing back in the office?

It's too bad none (or mostly none) of the foresters in the room felt the same way.

"I see how it will help the office people, but what's in it for me?" questioned one.

"It takes longer for me to punch it in the data collector than it does to write it down," argued another.

Upon sensing the building resentment, the HFIC (Head Forester In Charge) stood up in front of the room full of 40 or so foresters and said, "Well folks, this is the direction we are going, so you need to get with the program."

Eventually, most of them adopted the new technology and some even embraced it. But some of the more technologically-resistant folks would go as far as using "Rite in the Rain" paper to record data in the woods only to return to their truck and enter it into the data collector. However, I believe after a period of time they became quite adept at data entry in their truck, so much that the data collector eventually made its way into the woods with them.

That was 20 years ago. The 80386 was the mainstream computer CPU, email was still a novelty, websites were few and far between, and a mobile phone was about the size of lunch box.

PHOTO COURTESY OF WIKIPEDIA

Mobile phone equipment circa 1991.

Since that time, it seems like the forester has been bombarded with one mind-bending technology after another.

Sorry to break the news to you, but technology is not settling down anytime soon. Following is a taste of where I think some of the technology is heading. In this issue, you'll also read from my colleagues their take on the various technologies they work with on a regular basis.

GPS

Of course, GPS is close to my heart as I have written for *GPS World* magazine for many years and have been involved with GPS for more than 20 years. My first 10 years in GPS were spent developing GPS mapping products while the past 10 years have been spent as a power user of all sizes and shapes of GPS receivers, from ultra-miniature receivers giving mediocre accuracy to some of the highest-precision receivers ever made.

Since GPS has been around a long time, you may think that is has reached a level of technological maturity. In some respects, you would be right. It's been used by foresters since the late 1980s, albeit it has evolved significantly since then.

In the early 1990s, GPS mapping receivers used for forestry were backpack configurations with handheld data recorders. WAAS didn't exist, DGPS/beacons didn't exist, Bluetooth didn't exist, RTK Networks didn't exist, and Selective Availability (SA) was active. SA meant that GPS autonomous accuracy (without any sort of correction) was about 100 meters. To improve accuracy, users had to post-process their GPS data using GPS base station data. Public GPS base stations were virtually

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New Technology: Are You Ready?

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non-existent and internet access was not commonplace, so most folks had to install, manage, and maintain their own GPS base station.

In May 2000, one of the most significant events in GPS history took place. The U.S. Government turned off SA. Overnight, the autonomous accuracy of GPS receivers increased ten-fold. It was never turned on again, and years later it was announced the feature wouldn't be designed into future GPS satellites. It is gone forever.

Since then, GPS availability and accuracy has increased due to a number of GPS system advancements as well as GPS receiver advancements. The price of GPS receivers have also dropped significantly. In 1990, a GPS receiver designed for 2-5 meter accurate mapping was priced at over $10,000. Today, a sub-meter accurate GPS receiver can be purchased for under $2,000. That trend is going to continue. In fact, GPS is going to change a lot more in the next 10 years than it has in the last 10 years.

Last year, the U.S. Government launched a new generation satellite (model IIF) that adds another signal for civilians called L5. Once enough satellites are in orbit broadcasting L5 (as soon as 2015), you'll likely see very inexpensive, high-accuracy GPS receivers.

The beauty of the L5 signal is that it's supported by other GPS-like systems such as Europe's Galileo. The European Union is scheduled to launch their first two operational satellites this summer with the second pair scheduled for launch in early 2012. The first 18 Galileo satellites are projected to be in orbit by 2015. Since Galileo satellites use the same L1 and L5 frequencies as GPS satellites, a receiver designed for GPS is easily designed for Galileo too. One advantage of a GPS/Galileo receiver is that you'll have more satellites in view, and for foresters working under tree canopy or on steep terrain, this will make mapping a lot easier and quick-

Next Issue: Collaborative and Landscape Level Management

er. For example, today you might have 6-7 GPS satellites in view while you're in the woods. With future GPS and Galileo satellites, you might have 12 or 13 satellites in view.

GPS receivers are becoming cheaper, better and faster. Similar to personal computers, GPS receivers have declined in price and will continue to decline in price. Don't be surprised if you see high-precision GPS receivers for mapping being sold for $100-200 in the future. WAAS is going to support L5 too. Today, the best accuracy you can get from WAAS is around two feet. Once WAAS supports L5 (around 2020), it will be able to provide accuracy of around four inches to inexpensive L1/L5 dual frequency receivers.

The Russian satellite system (GLONASS) has brought a lot to the table for surveyors and engineers in the past 10 years. In 2000, it seemed the GLONASS program was dead in the water and heading for extinction. The Russian Federation has done a fantastic job of revitalizing GLONASS to the point that GLONASS has become a standard feature on high-accuracy GNSS receivers across the surveying and engineering industries. The value of GLONASS is not accuracy, but rather availability. If you're in the woods and having trouble tracking enough GPS satellites, GLONASS can add another 5-6 satellite signals, which can be the difference between getting a shot or not in dense tree canopy.

While GLONASS used to be a feature only offered in high-accuracy surveying receivers due to its complex design, you will start to see mid-range GPS mapping receivers utilizing GLONASS. It's also likely you'll see consumer GPS receivers offering GLONASS as well because in the past couple of months, two of the GPS chipset companies introduced GPS/ GLONASS chips for the consumer market.

Bottom line: GPS receivers are going to get significantly more accurate, cheaper, and work in more places than they do today.

Satellite imagery

At the Esri conference last summer, Lawrie Jordan, Esri's director of Imagery Solutions and founder of ERDAS, said this is the most exciting time to be involved in imagery in his 40-year career.

Commercial satellite imagery quality and availability is the best it's ever been. It wasn't that long ago that five-year-old, three-meter-pixel resolution, black/white satellite imagery was the norm. Today, GeoEye, DigitalGlobe, RapidEye, and Spot Image are delivering an amazing amount of digital imagery at even more amazing resolutions on a regular basis. Mr. Jordan predicts that in less than five years, every square inch of the Earth will be imaged (by satellites) constantly. He said we are already half-way there.

There is no better technology than satellite imagery for capturing the devastating impact of large-scale natural disasters such as the March 11, 2011, earthquake/tsunami in Japan. The following image (half-meter resolution) of Miniami Sanriku Cho, Japan, was captured by the GeoEye-1 satellite on Nov. 15, 2009, prior to the earthquake/ tsunami.

PHOTO COURTESY OF GEOEYE

The next image (one-meter resolution) was taken on March 12, 2011, a day after the fifth strongest earthquake in recorded history struck off the coast of Japan, creating a massive tsunami that caused devastating flooding and resulted in extensive infrastructure damage and loss of life.

PHOTO COURTESY OF GEOEYE

The following one-meter resolution image was shot by GeoEye's IKONOS satellite on March 23, 2011. According to GeoEye, this is the Indian Gulch fire burning near Golden, Colorado. As of March 24, the fire had consumed 1,500 acres and was 25 percent contained. GeoEye says this type of imagery may be used to assess and measure dam-

(CONTINUED ON NEXT PAGE)

age to forest and other types of land cover especially when compared to a false-color image of the same area.

IMAGE COURTESY OF GEOEYE

Bottom line: Commercial satellite imagery is becoming more readily available and at higher resolutions than ever before. Look for that trend to continue.

Lidar

Lidar (Light Detection and Ranging) is a remote sensing technology that is sometimes referred to as 3D scanning. Traditionally, lidar is thought of as an airborne technology with a scanner mounted in an aircraft that can map huge swaths of ground, collecting elevation data in order to create a digital elevation model (DEM) for topographic surveys and other types of analysis. While collecting the data is relatively quick (albeit expensive), a huge amount of data is collected and must be processed.

According to the US Geological Survey (USGS), two problems have hindered lidar for scientific applications beyond creating bare-earth DEMs.

1. The high cost of collecting lidar data.

2. The steep learning curve on research and understanding how to use the entire point cloud.

While airborne lidar has been around for quite some time, terrestrial (land-based) lidar has made a strong push in recent years, and has even made its appearance on mainstream television (CSI on CBS, 2005). Working on the same concept of 3D scanning, terrestrial lidar is not used from thousands of feet in the air looking down, but rather on a tripod scanning a room, or scanning a bridge from 200 feet in the distance.

PHOTO COURTESY OF WIKIPEDIA

Personally, I coordinated a 3D scanning project many years to create a 3D model of a wrecked SAAB 9000 as part of an accident reconstruction project. The process of scanning was very quick. It was completed within a couple of hours. The process of creating a deliverable (this was circa 2003), however, was another story. It was a very labor-intensive project that took weeks. Today, software to create a deliverable from these big "point cloud" files has improved dramatically and more increasingly, third party software developers are creating software tools that assist users in working with these data sets.

Terrestrial 3D scanners first started making their appearance in the land surveying and civil engineering professions. 3D scanners are an efficient way

to create complex as-built maps such as in refineries.

PHOTO COURTESY OF WIKIPEDIA

An example of real object replication by means of 3D scanning.

They still have somewhat of a steep price tag today, but they were especially expensive when they were first introduced, well over $100,000 at that time.

But terrestrial 3D scanning is hitting its stride and finding its way into other industries besides surveying and engineering. Yes, even forestry. Albeit in its early stages of development, 3D scanners are being hauled into the woods.

Take a look at the following illustration courtesy of TreeMetrics of Ireland.

According to TreeMetrics, millions of points are collected with each 30 meter scan. After downloading the scan data, software filters irrelevant data and creates a 3D profile of each tree. The DBH, height, taper, straightness and volume are calculated for each tree. Trees that weren't scanned due to heavy branches or other obstructions are modeled. Stem data files are then produced from which simulation models can be developed that will be used to estimate the product value before a tree is harvested. If harvesting is not done at that time, data is recorded and can be compared to future scans to monitor growth and health.

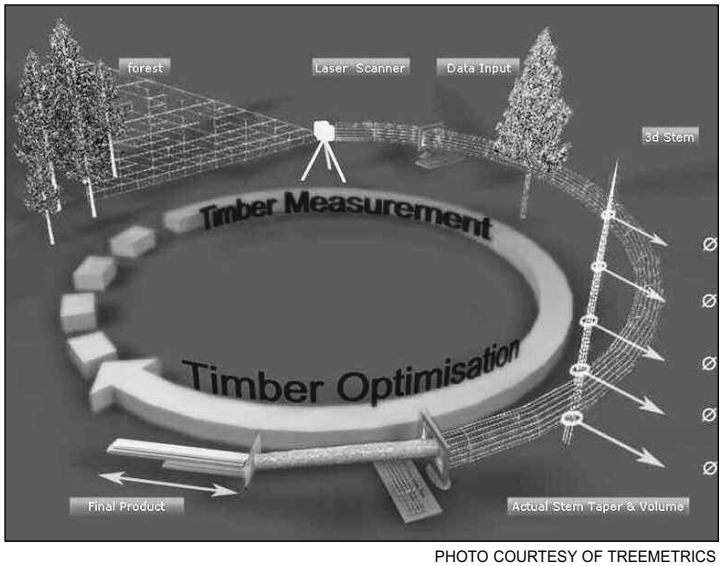

PHOTO COURTESY OF TREEMETRICS

Bottom line: 3D scanning, especially terrestrial 3D scanning, is a technology you'll see in the not-so-distant future, maybe even in the woods. Prices of 3D scanning equipment will continue to decline while software to handle the massive point clouds will continue to become more powerful.

GPS, satellite imagery and lidar are only three of a number of advancing technologies that foresters will see working their way into their toolkit. Mobile phones are also advancing at a rapid pace, becoming significantly more powerful and performing many more tasks than just a phone. The more advanced mobile phones have a GPS chip built inside as well as street maps and aerial photos a la Google and Microsoft. If you look back at mobile phones 10 years ago and compare them to today's phone, it's hard to imagine where they will be 10 years from now. They could quite possibly be the central piece of office equipment for all your communications and document management. ◆

Eric Gakstatter is a GPS/GIS consultant with over 20 years of industry experience. He is a contributing editor to GPS World *magazine and editor of their* Survey Scene *newsletter. He is also editor of* Geospatial Solutions, *a weekly enewsletter. You can reach him at ericpg@gps-mapping.com.*

Getting Started with Mobile GPS

BY JON ASCHENBACH

Now is a great time to get started with mobile GIS. The equipment and software are inexpensive and more capable than ever. The GPS (Global Positioning System) available to us has the highest number of satellites and best orbit distribution we have ever seen. And we can now utilize the Russian GLONASS satellites to our best advantage under dense tree canopy.

For a forester, being able to combine great GPS capability with color imagery in the background is very helpful. Rather than trying to locate yourself on a paper copy of an aerial photo (often in the rain), your position is continually pinpointed on an image in the mobile GIS software.

The benefits of using a mobile GIS system go far beyond seeing our position on a digital image. This is a short list of capability built into current mobile GIS software:

1. Follow a plot grid;
2. Traverse units to determine acreage;
3. Traverse roads to improve forest inventory acreage;
4. Find property corners by navigating to known coordinates;
5. Collect field data as attributes tied to a GPS position;
6. Measure distances; and
7. Inventory the location, size, and condition of culverts.

With current Mobile GIS software, foresters have the ability to integrate: 1) GPS; 2) color imagery; and 3) GPS offsets into one package. I will discuss each of these separately, although it is amazing what the synergy is by using all of them.

GPS helps the forester collect new data in the form of points, lines, or polygons. Points can be culvert crossings, property corners, plots in a sampling grid, bird nests, and much more. Lines commonly collected include roads and streams. Polygons allow us to calculate acreage and are used for timber type boundaries, timber sale acreage, property boundaries, or anything else we need to calculate area from.

This data is normally collected as a shape file, a universally accepted and transferable format that allows data to be exported to ArcGIS, ArcView, MapInfo, AutoCAD, and a variety of other mapping programs. Shape files can also be transferred from these desktop mapping programs to mobile GIS software. This can be very helpful because the imagery does not have all of the information that we need. For example, by having the roads depicted on top of the imagery, it makes it easier to navigate when roads go through mature timber. The mature timber often covers roads, making them difficult to identify.

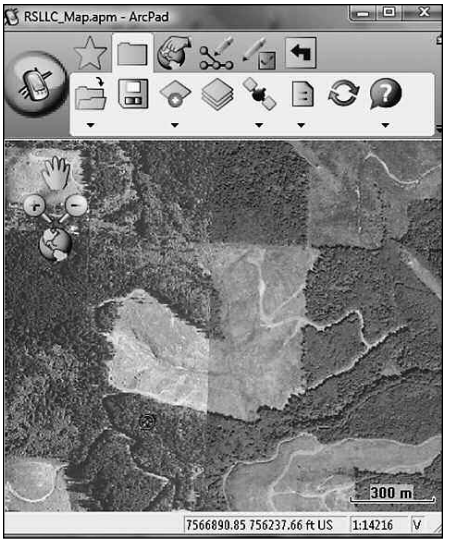

IMAGE COURTESY OF JON ASCHENBACH

A real-life example of NAIP imagery in ArcPad 10 Mobile GIS Software.

Imagery

Imagery includes a variety of image formats such as MrSID™, jpeg, Jpeg2000, Tiff, and others. The value of having imagery combined with GPS is being able to know your exact location on the image at any given moment in time. With high resolution imagery (two foot to one meter per pixel), you can identify different species, relative sizes of timber, brush patches and much more. The most common form of imagery used by foresters is the one meter, color, NAIP (National Agriculture Imagery Program) imagery available in a MrSID format. Statewide coverage for California, Oregon, Idaho, and Washington is available at minimal or no cost. The NAIP imagery is as recent as 2009 vintage, and most western states will be flown again in 2011.

The NAIP imagery is especially useful because large areas such as entire counties can be brought into view at one time. As the user zooms in to a particular area, only that portion of the imagery is enlarged. This makes the NAIP imagery in MrSID format very efficient. It is common to store five to seven counties of NAIP imagery on a two gigabyte storage card, which makes it available for use at any time.

Offsets

Virtually all mobile GIS software has the ability to take offsets. Offsets can be points, lines or polygons.

For the most part, users will more frequently collect offset points than lines or polygons. There are many reasons for taking GPS point offsets. The most common are that the user cannot physically get to a point or the satellite reception is poor while occupying the point. Frequently, the user can go to a nearby opening with better satellite coverage and set the offset point in the proper location. This simply involves inputting the distance and azimuth to the offset point. The improvement in position accuracy from the use of offset GPS points can be very significant. It can also save a lot of time, often wasted trying to collect data in very poor GPS reception areas.

Many foresters also collect offset GPS point data at the edge of the unit they are timber cruising. Once one of their plot lines gets close to the unit boundary, they use a laser rangefinder to shoot tagged trees on the unit boundary as GPS offsets. They often can shoot 100 to 200 feet in both directions. As this only takes about a minute or less, they can verify the acreage of the unit based on actual GPS data collected in the field. Once they have collected the points, they make a polygon back in the office.

Users frequently record offsets for lines when collecting GPS data along streams. It is difficult, if not impossible, to record the absolute centerline of a stream. With the mobile GIS offset line option, the user walks to one side of the stream while the software records the data a predefined distance either left or right of the actual walked path.

Offsets are also collected when collecting GPS data for roads when the vehicle antenna is not directly over the centerline of the road. If it is generally five feet to the right of the actual centerline, the offset would be five feet left. This capability allows the driver to safely drive the road system while collecting accurate GPS data.

Costs

A complete Mobile GIS system including Pocket PC, GPS unit, and software can be purchased for just over $1,000. Systems utilizing higher accuracy GPS capability will cost a few thousand dollars. Used systems can be very inexpensive, although it is important to note that some older systems may not have enough memory or capability to use currently available imagery. They may also not be able to utilize SBAS (Satellite Based Augmentation Systems such as WAAS) which provide additional GPS accuracy in real time.

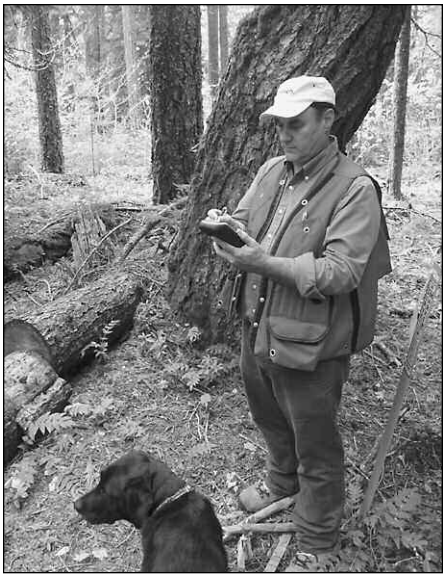

PHOTO COURTESY OF RESOURCE SUPPLY LLC

Jon Aschenbach and Miles the "GPS Dog" collect data with the MobileMapper 100 at the Clackamas GPS Test Course.

Commonly used mobile GIS software includes ArcPad by ESRI, Solo Field CE by Trimble, MobileMapper Field by Ashtech, and several others.

Conclusion

Mobile GIS is available to foresters at minimal cost and with a minimal learning curve. The cost savings can be considerable. Savings includes higher productivity in the field such as increasing the number of sample plots collected in a day, less time lost navigating to job sites, and generally less energy expended to get the job done in the time allowed.

Getting started with mobile GIS is easy, relatively inexpensive, and fun. ◆

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For Many Foresters, Laser Rangefinders are No Longer Optional Equipment

Imagine not having to wade through creeks or directly through brush just to get a usable field measurement. With today's laser rangefinders and software solutions, the dream becomes reality. Timber cruisers can measure tree heights and monitor slope grades with unparalleled ease. Traversing timber sale boundaries and stem mapping become almost effortless. From measuring tree heights to verifying buffer zone layouts, laser rangefinders are easy to use, provide accurate measurements, and help you save time and energy.

Other rangefinder applications in the field of natural resource management include the ability to monitor, assess and manage resources such as sensitive plant species or wetlands, and mapping wildlife habitats, cliff dwellings, and monuments without occupying dangerous areas. For archeology sites, you can collect reliable data without compromising the surroundings. Water resource management is another field where the power of lasers can make a difference. By letting you collect large quantities of data in a short amount of time, and without having to occupy the points you are measuring, you can monitor resources without the worry of disturbing a site.

Several companies offer a full range of powerful, compact lasers with features tailored for gathering field data. Different brands and styles of laser rangefinders from which you can select are manufactured by Laser Technology, Opti-Logic, Haglof, and MDL, just to name a few. Nikon and Bushnell also manufacture laser rangefinders, although many of these models only measure in yards and are oriented more toward outdoor enthusiasts like hunters rather than foresters. Some models are small enough to fit in your vest pocket. For convenience in the field, they run on standard AA batteries and some offer optional Bluetooth.

But before we get into how to select the best rangefinder to fit your needs, it may be helpful to know how an electronic rangefinder works.

The word "laser" stands for "Light Amplification by Stimulated Emission of Radiation." The type of laser used in many products has a very narrow beam width of roughly three feet (0.3 m) at 1,000 feet (100 m) out. It calculates distance by measuring the time of flight of very short pulses of infrared light. Any solid object will reflect back a certain percentage of the emitted light energy. The internal electronics measure the time it takes a laser pulse to travel to the target and back with a precision, crystal-controlled time base. Knowing the constant speed of light, it is then possible to calculate the distance traveled. These lasers are completely eye safe, meeting FDA Class 1 specifications. The radiated light power of lasers is on the order of 50 microwatts, or approximately one twentieth the light power of a typical TV remote control.

Some rangefinders have a foliage filter to allow use in dense brush. With the foliage filter in place, the user must shoot a reflective target. The measurement will be accurate if the target is hit. If the target is not hit, no measurement will be made. Often the user can move a few inches left or right to get the shot. Some units have the ability to run in a mode allowing use with light fog (or heavy dust).

On some laser rangefinders this is accomplished by setting "gates," which limit the minimum distances that measurements can be made. In other laser rangefinders, the user can select "farthest" mode. When the user presses the fire button to take a measurement, any returns from a light fog are ignored, and the farthest distance (i.e., to the tree) is recorded.

With all these available features, how do you decide which laser rangefinder best fits your needs? As mentioned earlier, there are many brands and companies that manufacture this piece of technology. For purposes of this article, models that are manufactured by Laser Technology, a company that has been a leader in the forestry technology field, will be used as an example.

PHOTO COURTESY OF LASER TECHNOLOGY, INC.

Laser Technology's TruPulse laser rangefinder is used in the field, note its compact size.

IMAGE COURTESY OF LASER TECHNOLOGY, INC.

Laser Technology's TruPulse 360 laser rangefinder with integrated compass viewing the in-scope data display.

Selecting the best one

The choice analysis table provides detailed information on four models of laser rangefinders. They vary in price, size, maximum usable distance, and other features.

All laser rangefinders listed can utilize a filter, which requires a reflective

Table 1. Choice Analysis for Four Laser Rangefinders.

Criteria	TruPulse 200	TruPulse 360B	Impulse 200	Impulse 200LR
List Price	$669	$1,699	$2,495	$2,795
Maximum Distance to Tree or Tower	1,500'+	1,500'+	495'	985'
Minimum Distance	Point blank	Point blank	Point blank	Point blank
Built-in Clinometer	-90º to +90º	-90º to +90º	-90º to +90º	-90º to +90º
Built-in Compass	No	Yes	No	No
Missing Line Mode	No	Yes	No	No
Weight	8 ounces	8 ounces	2.2 pounds	2.2 pounds
Size	5" x 2" x 3.5"	5" x 2" x 3.5"	6" x 2.5" x 5"	6" x 2.5" x 5"
Display	In view finder	In view finder	External LCD	External LCD
Accuracy	<1' to 200'+	<1' to 200'+	1/10 foot normally	1/10 foot normally
Eyepiece Magnification	7x	7x	None	None
Filter	$39 option	$39 option	Built-in	Built-in
Ports	Wired RS232 (Bluetooth Optional)	Wired RS232, Bluetooth	Wired RS232	Wired RS232
Temperature Range	-4º to 140ºF	-4º to 140ºF	-22º to 140ºF	-22º to 140ºF
Environmental Rating	NEMA 3, IP54	NEMA3, IP54	IP67, NEMA 6	IP 67, NEMA6
Battery	2AA	2AA	2AA	2AA
Battery Life	7,500-15,000 shots	7,500-15,000 shots	20 hours of use	20 hours of use
Bluetooth	No (optional)	Yes	No	No

For an explanation of what the Environmental Ratings refer to, see report called "What Does IP67 Mean" at www.resourcesupplyllc.com.

target. This feature allows the user to make accurate measurements in dense brush and other difficult situations.

The following procedure can be used to select the best laser rangefinder for your needs. It takes a bit of time, but will help ensure that you purchase the best unit.

1. Determine the problems you need to solve. i.e., measure tree heights, traverse timber sales, collect GPS offset data for utility infrastructure, etc. Also note the maximum distances involved.

2. Investigate laser rangefinders that will help you solve the problems listed from item one.

3. Use choice analysis to select the best model for your needs:

a. List models across the top of a matrix (see table).

b. List your selection criteria on the left hand side of the matrix in approximate order of importance, top to bottom.

c. Fill in the matrix with real data. Be very specific as to size, weight, price, etc.

d. Cross off any models that don't meet mandatory criteria.

e. Select the best option for each of your selection criteria and highlight it.

f. Look at what you have highlighted and make your best decision based on how each model fits your most important needs.

g. Find a dealer that will sell you the selected model, and provide support and training.

Some laser rangefinders include a built in compass. While the compass will certainly give the user an azimuth, its primary benefits include facilitating taking GPS offsets and measuring in missing line mode. GPS offsets are helpful as they allow a forester to read GPS satellites in an area with better satellite reception while setting the point anywhere within visible range. The missing line capability allows foresters to measure the distance, azimuth and inclination between any two remote targets. This could be slope distance on a severely leaning tree, stream width on a stream with limited access, or for clearance between trees and powerlines.

The new generation of laser rangefinders are readily available, easy to use, and very accurate. Many foresters view them as required equipment for any and all field work. ◆

This article was compiled from information provided by Jon Aschenbach of Resource Supply LLC, and Joe Cronn of Laser Technology. Jon can be reached at 503-521-0888 or jon@resourcesupplyllc.com. Joe can be reached at 360-798-9928 or jcronn@lasertech.com. *A special thanks to Jon Aschenbach for his editorial support.*

Laser Rangefinder Articles

The Forestry Source has printed several articles on laser rangefinders that might be of interest to the reader.

June 2009 *Forestry Source*:
Two Laser Rangefinders: Nikon's Forestry 550 and Opti-Logics InSight 1000 by Steve Wilent, *Source* managing editor

November 2009 *Forestry Source*:
Field Tech: Taking the Measure of MDL's LaserAce Hypsometer by Steve Wilent, *Source* managing editor

October 2010 *Forestry Source*:
Field Tech: Haglof's Vertex VL-402 Laser Hypsometer with Ultrasound by Roger Greene, Mason, Bruce & Girard, Stockton Springs, Maine

Lidar Products Impact Field Operations

BY EMMOR NILE

"186,000 miles per second, it's not just a good idea, it's the law."

This is an old physics joke about the speed of light based on the slogan from the era when the speed limit was lowered to 55 MPH. The speed of light is one law that Matt Boyd of Watershed Sciences, an Oregon-based lidar vendor, would like to have changed. The speed of light just isn't fast enough for him.

Lidar technology has been available for several years to measure the location of objects both from the ground and from aircraft. There are several emerging uses for ground-based lidar including crime scene measurements at a fire origin and individual stem analysis to determine optimal log manufacturing. This article, however, will focus on current applications of lidar elevation data collected from an aircraft.

In the last four years, due to improved technology for measurement, data storage, and data processing, lidar data collection in Oregon has increased at a tremendous rate. Lidar works on the principle of timing the reflection of laser pulses from a known location. The lidar sensors are able to measure time at the nanosecond level or the amount of time for light to travel about 5/8 of an inch (1.5cm).

By knowing the sensor location at the time the pulse was sent it is possible to directly measure not only the vegetation, buildings, and other structures, but also the ground surface below the trees and vegetation.

Watershed Sciences has collected more high density (8+ pulses/m^2) data in Oregon than any other organization. They have been able to get around the law of the speed of light by equipping the aircraft with a second lidar sensor both of which send 105,000 pulses per second and receive up to four returns per pulse.

While the technology of lidar collection is interesting, the average forester needs to ask questions like "What's in this for me?" and "What can we afford?"

When the Oregon Department of Forestry (ODF) first contracted for lidar elevation collection in 1997 the project was a bit of a novelty and computers of the day had difficulty processing the data. Today lidar-derived products have an impact on virtually every field operation conducted by ODF. The major uses ODF staff makes of lidar data can be grouped into two categories: vegetation derived applications and engineering uses.

The most commonly used form of lidar data is that of processed rasters. Rasters are pixels of a single value like elevation or color in a photograph. The commonly used rasters include digital elevation models of the top surface and bare earth surface, as well as the simulated hill shading of each.

Typically the lidar products used in Oregon are 3.0 feet in resolution and have an elevation accuracy of a few inches. By subtracting the bare earth from the top surface, a canopy height model (CHM) can be derived. From the CHM it is possible to run some simple analysis to determine the location of the tops of the dominant and co-dominant trees.

While it is interesting to know that on Oregon's Elliott State Forest there are 5,112,486 dominant trees with an average height 89.7 feet, it is much more valuable to have the numbers and heights of trees in a specific sale unit or corridor. Sale planners are able to make a quick determination about stands suitable for thinning, the number of trees and rough volume that will be retained in a riparian corridor, or the best location for green tree retention placement. Derek Bangs, Natural Resource specialist on ODF's Astoria District says, "With lidar data I can make the best use of my time in the woods to make sure my timber sales and new roads are laid out correctly and with higher accuracy."

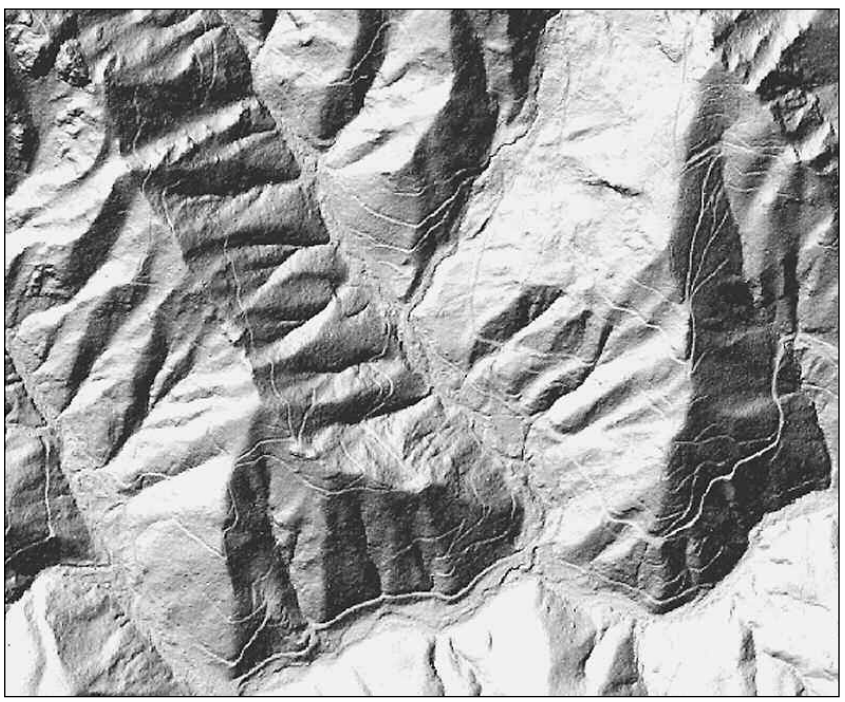


IMAGE COURTESY OF OREGON DEPARTMENT OF FORESTRY

This image shows a simulated bare-earth hillshade of part of the Tillamook State Forest in the Little South Fork of the Kilchis River. The resolution of the lidar-based digital elevation model allows foresters to visualize the relief of the ridges, channels, roads, and old skid trails.

Armed with canopy and tree heights, ODF biologists are able to quickly screen stands for potential marbled murrelet habitat. The time of an ODF biologist is stretched thin and this tool helps them make the best use of their time in the field.

The single biggest impact of lidar technology on the science of forestry is that of forest inventory. Traditionally forest-wide inventories have

been based upon samples taken within different vegetation strata across the landscape. Now we are closer to being able to have a true inventory of the trees in a given area or ownership.

For a timber cruiser the most difficult standard measurement is that of tree heights. Lidar enters the picture and gives biometricians a direct height of the dominant trees (without adjustment for tip or lean). George McFadden of the BLM State office in Portland has been working with researchers in the Resource Monitoring and Assessment program of the PNW Research Station to combine lidar and plot measurements to determine forest inventory variables such as:

- Lorey's basal area weighted height in feet;
- Live basal area, square feet/acre;
- Live density, trees per acre;
- Live quadratic mean diameter;
- Live total stem volume to a 3" top; and
- Live total merchantable volume to a 3" top, board feet/acre.

These values are calculated for each cell of 10th acre rasters across the landscape. Once this information is statistically validated for an area it's easy to see how a forester can leverage this information to make better decisions. Although lidar can produce the above mentioned structural forest inventory variables, it cannot produce estimates by species classes. Therefore, foresters need not worry; we'll still need to get out in the woods to conduct stand exams to estimate volumes by species when planning operating units.

The engineering uses of lidar data are also impressive. In the past land managers used the best available topographic information available, which was typically the 1:24,000 USGS topographic quadrangles. The contour lines on these maps were developed using photogrammetric methods, and due to the forest cover in western Oregon the USGS was not able to certify that these maps met the national map accuracy standard of +/- one-half a contour interval (typically 40 feet). The lidar bare earth model is an accurate representation of the ground surface under the vegetation and can be used in many ways:

- Landslide and unstable slope identification to avoid issues resulting from improper road location;
- Steep slope and operable lands identification;
- Determining tractor ground versus cable ground and optimal landing locations;
- Identifying of potential cultural resource areas;
- Road design and layout including mass calculations for fills and cuts;
- Determining yarding profiles and blind leads for cable systems;
- Determining accurate locations of stream channels; and
- Locating potential fish barriers.

The cost of lidar acquisition is not cheap. The lidar sensors and the aircraft that carry them cost millions of dollars. In addition to the hardware, the cost of fuel continues to be a significant amount and the trained personnel to collect and process the information all contribute to the cost of around $0.70 per acre when collected in large blocks. Because this cost is significant, it is critical that federal, state, and local agencies work together to ensure that lidar collection efforts are coordinated and are not duplicated. Hopefully people like Matt Boyd will continue to find ways to get around the limitations of the speed of light to give foresters a valuable tool to get their jobs done. ◆

Emmor Nile is the GIS coordinator for the Oregon Department of Forestry in Salem. He can be reached at 503-945-7418 or emmor.h.nile@state.or.us.

For More Information

In Oregon, contact the Oregon Department of Geology at www.oregongeology.com.

In Washington, the Puget Sound Lidar Consortium is a good source of information: http://pugetsoundlidar.ess.washington.edu/index.html.

Foolproof Ways to Avoid Losing Data

BY JIM LAHM

Walking through the woods, you glance down at the screen of your datalogger and notice that it's blank. You wonder: Did I charge my batteries last night? Did I set the unit up to go to "sleep" after a few minutes? Did the backlight go out and I can't see the screen clearly?

These and many other questions can go through your mind when you are startled into the possibility that you may have just lost your data.

The title of this article assumes that you are no longer using only pencil and Rite in Rain paper to record field data. In this age of electronic data collection, it's imperative that you understand the system you are using to ensure that you return to the office with data intact.

Four components contribute to the safe storage and/or the haphazard loss of data:

1. Hardware. What hardware are you using?

2. Operating system. What operating system does your device use?

3. Software. What software are you using to collect data?

4. Data storage. What storage media does your device support?

It's important to evaluate each of these components to ensure that you understand the capabilities and limitations of the entire system, and further, that you adhere to a sensible, repeatable protocol that assures data integrity and safety.

With these points in mind, let's take a look at each one.

Hardware

You are using either a DOS-based unit, a Windows Mobile unit, or a unit that uses a custom operating system. The typical hardware device has either volatile memory or non-volatile memory. The term "memory," in the context of this article, refers to the data storage and not RAM (Random Access Memory).

If your unit has volatile memory you could be in trouble. This type of memory will be purged if the device loses power, locks up, or reboots. If you have a device like this, look for an SD card slot or a PCMCIA card slot on your handheld that will accept a data storage card where you can safely store collected data. Be aware that there is often a limit as to how large the data storage capacity can be. Most hardware will have an upper limit listed in the specifications. This will help you to choose a storage card that will be supported by the operating system of that device.

Non-volatile memory is better. Modern units today have this type of memory. This type of memory is secure, so that even if your unit loses power, locks up, or reboots, all the data you collected up to that point will be safely stored in internal memory. Internal memory is the data storage capacity built into your handheld device.

External memory is the best. Regardless of the type of internal memory your unit has, it is always recommended to use a storage card of some sort. These come in all physical and data capacity sizes. The older storage cards called PCMCIA cards are large (about the size of a credit card) and the slot takes up a lot of physical space in the datalogger. For this reason, they have been phased out. We think the abbreviation stands for People Cannot Memorize Computer Industry Abbreviations.

The newest form of external storage is the SD (Secure Digital) card. External memory is data storage that you add to your unit via an SD or other type of card. The card resides inside the unit.

These cards have different physical and data capacity sizes. Some of the physical sizes are designated as:

1. SD (Secure Digital): about the size of a postage stamp;

2. SDHC (Secure Digital High Capacity): same size as above;

3. Mini-SD (Miniature Secure Digital): smaller;

4. Micro-SD (Mirco Secure Digital): smaller still; and

5. Express card: about the size of USB "thumb" drive

The typical data capacities of these cards are: 1GB; 2GB; 4GB; 8GB; 16GB and 32GB.

Larger capacity cards are offered, but the prices increase exponentially. And many devices will not support any card larger than a 16 or 32GB card. Again, be aware of what your datalogger can recognize before you buy.

It's also important to be aware of the Speed Class designation for storage cards. They are listed as Class 2, 4, 6, and 10. The numbers refer to how many megabytes per second (MB/s) they can read and write data. The higher the number, the faster the data

access to pull data from the card and store data onto the card.

Another excellent reason to use this type of external storage is that even if your unit is run over by a truck, you can often retrieve the data from the card due to its low profile, small size, and the fact that the card is already completely flat. In this case, your datalogger acts as a protector to the card, just as the metal in a car can protect you against injury in a car accident.

Operating system

If you are using a DOS-based device, it's very important that you use an external data storage card. If you are using a Windows Mobile device, the security of your data will depend on which version of Windows Mobile it is. Here's a list of mobile operating systems:

1. Windows CE
2. Windows CE.NET
3. Windows Pocket PC 2003
4. Windows Mobile 5
5. Windows Mobile 6
6. Windows Mobile 6.1
7. Windows Mobile 6.5

The first three operating systems use volatile memory, which means that you must either use a data storage card or remember to back up your data manually using a program on the device called Sprite Backup. Failing to do either of these things could result in data loss if your unit locked up and has to be rebooted, or it lost power.

Any operating system from Windows Mobile 5 to the present will automatically store the data in non-volatile memory, which means your data is safe.

Software

What software are you using to collect data? Well designed software will automatically and immediately write any collected data to a storage card or to non-volatile memory. In this component of your system, the responsibility is on the software developer. "Good" software always includes a reliable method to collect and safely store data. Check the specification of your software to determine its characteristics.

Storage media

We don't really have to repeat this again, right? Regardless of how new your datalogger is, no matter what operating system it's using, no matter what software you're using to collect data, you are encouraged to use a data storage card to store all your data. This is the most reliable way to store and retrieve data and will eliminate your worries about data loss. It's foolproof, providing you don't drop your unit off a 1,000-foot cliff.

If you are using a unit that doesn't offer a card slot, then consider upgrading to a new unit. It will have a much faster processor, an easier-to-read screen, more RAM, and a card slot that will accept at least a 16GB storage card.

If you have any questions about this article or would like assistance in deciding which unit would be best for your application and field methodology, please contact me. I'm always happy to help. ◆

Jim Lahm is with Electronic Data Solutions in Portland, Ore. He can be reached at jim@elecdata.com or 503-624-6133.

Public Domain Imagery Available from the USDA

BY MIKE McGUIRE

Many industries, including the forestry industry, have grown to depend on updated aerial and satellite data for their mapping requirements. A recent picture of a forester's service area provides crucial information about the earth's surface. Collecting new imagery for large areas of forested land, on a regular basis, at an acceptable image resolution, is cost prohibitive. The alternative is finding current imagery data from other sources. The USDA Agriculture Imagery Program (NAIP) is an alternative source of imagery for the forestry industry.

Most regular, reoccurring imagery programs take place in densely populated areas, not rural, forested America. There is higher demand for regularly updated imagery in urban areas where the land use changes constantly and security issues and planning are primary and ongoing considerations. Regularly scheduled imagery programs (and I use this phrase loosely) covering rural areas are usually conducted by the U.S. government. Unless the data is classified, government imagery data is considered in the "public domain." The term "public domain data" refers to data that is openly available to everyone and not subject to copyright protection. Public domain data is appealing because there are no licensing restrictions and it is typically available from the government at a very modest cost.

The U.S. government has been collecting aerial and satellite imagery for years. In the past, accessing aerial and satellite imagery data from the government was difficult or next to impossible. It involved hours of research locating the appropriate federal agency, understanding the agencies' imagery product options, processing the imagery (minimal processing fee) and waiting to receive the data. Today, NAIP is collecting imagery on a regular basis and evolving technology is making it easier, faster and less expensive to access.

The USDA NAIP Program has become one of the best sources for public domain imagery. The program collects one meter resolution color aerial imagery of every state, excluding Alaska, every two to three years. One meter resolution seems to be an acceptable resolution for the forestry industry, although some may argue that higher resolution imagery is better suited for the forest industry. Partnerships between some states and the USDA to collect a half meter product have taken place. During these tough economic times, these partnerships are expected to be few and far between. The one meter, color (RGB) product is currently the USDA standard offering.

All NAIP collections happen during the growing season and will always be collected during the summer months (leaf on). This summer schedule supports the USDA crop compliance program, which was the driving motive behind the creation of NAIP. In the forestry industry, summer collections are acceptable for fall depletion mapping, road updates and survey references. It should be noted that in the Pacific Northwest, the USDA schedules late summer flights of higher terrain once the area is free of snow.

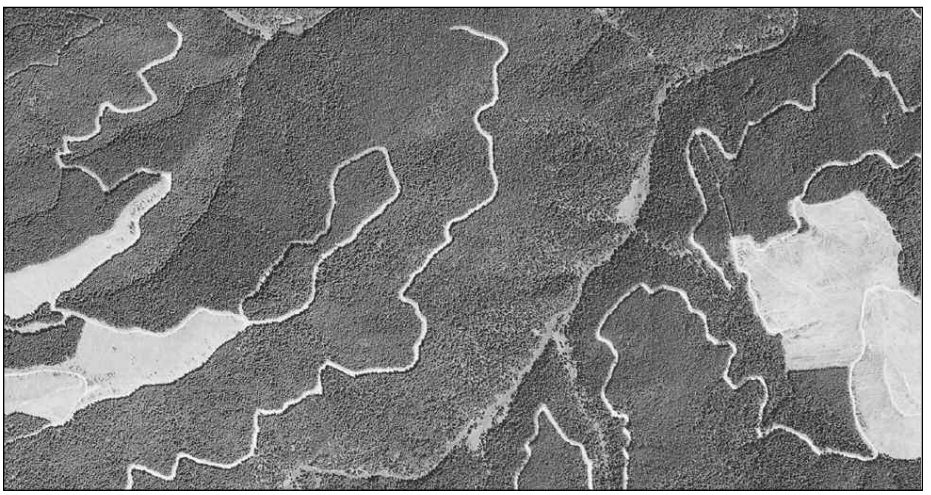
NAIP imagery becomes available sometime during the fall, following the flying season. There are a variety ways to access NAIP data for little or no cost:

1. Download compressed county mosaics in MrSID™ format from the NRCS GeoSpatialDataGateway website.
2. Use the USDA Image Services solution located on the USDA Aerial Field Office (APFO) website.
3. Contact the USDA APFO directly.
4. Contact a private data provider.
5. Use Google™ or Bing.

Remember that there is no regular order in which the USDA releases a state data set. There are many variables that affect release schedules: flying conditions, imagery production and distribution. The best practice is to start checking into NAIP release dates in September. States are usually completed by mid-December.

NAIP is an evolving national imagery program. In 2003, only agriculture lands were collected. Today full state collects are the standard. NAIP products have consistently improved in quality, and diversity, with the introduction of sub meter collections, and the addition of a fourth IR band in some state collections. Timely delivery of data to the user base has also dramatically improved, and continues to improve, since the inception of the program in 2003. NAIP data will continue to be a valuable, low cost resource for the forestry industry. ◆

Mike McGuire is with Ascent GIS, Inc. in Spokane, Wash. He can be reached at 509-747-2495 or mikem@ascentgis.com.



NAIP IMAGE COURTESY OF ASCENT GIS, INC.

A NAIP image of a forested area in Idaho.

Tribal-State Cooperation on Spatial Data Processing in Interior Alaska Benefits All

BY WILL PUTMAN

As foresters working closely with spatial technologies for a nonprofit tribal organization, we often found ourselves scrambling to take advantage of new technological developments. Increased capacity of computer hardware, software developments, new technologies such as GPS, or new and better forms of spatial data are examples of some of these developments. We found ourselves in just such a situation in the years immediately following 2000 when new forms of high-resolution remotely-sensed satellite imagery were becoming available from commercial sources.

The organization we work for, Tanana Chiefs Conference (TCC), is a nonprofit corporation dedicated to providing services to 42 Native Alaskan tribes and tribal communities in interior Alaska. TCC provides a wide variety of services including health services, housing assistance, a range of social services, realty services on Native trust land, cultural resource management, and assistance with natural resource management, including forestry.

The Forestry Program at TCC focuses on providing forestry management services on Native allotment trust properties in the region and technical assistance to individuals and Alaska Native corporations. As part of that service delivery, we developed some capacity for processing and managing spatial information, and assisted tribes in the region and other programs at TCC with those technologies. The newly-developed availability of submeter resolution imagery showed much promise not only to the natural resource management functions that are the core of the Forestry Program, but also for other functions such as community planning, transportation planning, cultural resource management, and real estate service. The challenge was developing the capacity to acquire the licensing, handling the processing, and managing the image data itself.

PHOTO COURTESY OF TCC FORESTRY

Collection of ground control with a helicopter and GPS receiver.

Because of common interests and overlapping concerns, TCC Forestry cooperated on projects previously with the local office of the State of Alaska Division of Forestry (DOF). An opportunity arose in 2002 to join forces with DOF on another project focused on acquiring and processing satellite imagery in the Tanana Valley of interior Alaska. Our interests were driven by somewhat different goals—TCC was motivated primarily by the need for community-level mapping, and DOF was driven by wildland fuels mapping for the Tanana Valley and other wildfire related issues—but the objectives of the two organizations aligned well enough to warrant a cooperative venture. The project was primarily supported by a grant from NASA, but additional funding support was solicited from other land managers and agencies in the Tanana Valley, which allowed expansion of the initial scope of the project.

The project was focused on acquiring and processing high-resolution image data (spatial resolution < 1m) around communities in the Tanana Valley and medium-resolution imagery (spatial resolution of 2.5m) across the landscape in the Tanana Valley. The platforms and vendors chosen to provide the imagery were QuickBird imagery from DigitalGlobe for the high-resolution data, and Spot 5 from the Spot Image Corp. for the medium-resolution data. Both vendors provided data in the form of basic, ungeoreferenced data composed of two images at each location—a higher-resolution panchromatic image and a lower-resolution multi-spectral image. In each case, the two images were orthorectified (georeferenced with terrain correction) separately, and then the multi-spectral image was pan-sharpened by fusing it with the corresponding panchromatic image, producing a higher-resolution pan-sharpened orthorectified image that was a primary product of the project.

There were several technical challenges in accomplishing the goals of the project. Data handling and processing capacity needed to be ramped up in both organizations to accommodate the large datasets. Expertise in sophisticated image processing software had to be developed to handle the image processing, which included image orthorectification and georeferencing, pan-fusing of panchromatic and multi-spectral image layers, image

(CONTINUED ON NEXT PAGE)

mosaicing and color-balancing, and other functions. Additional expertise and equipment needed to be acquired to collect ground control with resource-grade and survey-grade GPS equipment, a critical component in the orthorectification work.

TCC and DOF staff participated in the collection of the ground control, often using a contract helicopter made available through DOF's wildfire management program to access remote areas. Subsequent image processing was shared between the two organizations, with much of the orthorectification work conducted by TCC staff, and much of the pan-sharpening and mosaicing work done by DOF staff. At all phases, TCC and DOF staff worked together closely to share expertise to complete project tasks.

IMAGE COURTESY OF DIGITALGLOBE

An example of QuickBird imagery at the village of Healy Lake.

The result was a set of accurately georeferenced high-quality images that were made available to participating agencies that have since proved very useful for a wide variety of activities. High-resolution imagery was made available at 15 communities in the Tanana Valley covering 1.8 million acres, and medium-resolution imagery covering 8.2 million acres, including most of the 1.8 million-acre Tanana Valley State Forest. Perhaps most importantly from our perspective, the experience and capacity that was developed by our staff at TCC has allowed us to continue with similar work elsewhere in our region, allowing us to serve our clients more effectively. This was a project that would have been difficult for either of our organizations to accomplish alone, but was made achievable by cooperating together in a mutually beneficial way. ◆

Will Putman is Forestry director, Tanana Chiefs Conference, in Fairbanks, Alaska. He can be reached at 907-452-8251 x3373 or will.putman@tananachiefs.org.

Get In Touch, Stay In Touch

BY MATT KRUNGLEVICH

When you move what is the first thing you do? Change your address of course. This ensures all of your magazine subscriptions, bills, and letters still get to you. Well, it's no different in the electronic world. New spam filters, different jobs, retirements, or just email changes all prevent you from getting your mail. To update your information with SAF, follow these easy steps.

• Go to www.eforester.org and click on "profile" in the upper right corner.

• You will need your SAF member number to login; follow the instructions on the page for your password.

• After you successfully login, review your membership information, and if there are updates, click the "edit" button at the bottom of the page.

• Remember to save any changes.

It's just that simple!!!

The Oregon and Washington State Societies, and several chapters, use an e-marketing service called Constant Contact. This service allows SAF members to keep up-to-date with the happenings of their local chapter and state society. All OSAF and WSSAF chapters have free use of this service and can design professional newsletters and emails with just a few clicks. To learn how to use these services, contact Michele at the SAF Northwest Office (michele@safnwo.org, 503-224-8046); she'll have you looking like a pro in no time.

In addition to Constant Contact, OSAF and WSSAF state societies and chapters have Facebook pages. With over a half-billion users worldwide, Facebook has become the de facto means for people to communicate. Facebook provides users with real-time updates and the ability to communicate with other people that are in your friend group. This is a perfect fit for members to keep in touch and stay up with current events at all levels of SAF. Many chapters now post newsletters, meeting schedules, and other information so members can reference it when they need it. If you don't have a Facebook account, it's free to setup, and easy to use. Chances are your friends and family are already on Facebook, so what are you waiting for?

SAF is working for you by keeping on the cutting edge of forestry. So, visit the newly designed forestry.org website and join Facebook to engage with your colleagues and friends. And remember, all these services need updates occasionally. Next time you change your address, postal or electronic, keep SAF in mind along with the postal service. ◆

Matt Krunglevich serves as delegate-at-large for the Oregon SAF. He can be reached at matthew.krunglevich@state.or.us.

Keeping Forestlands in Forest

DON'T FORGET TO REGISTER FOR THE JOINT CONFERENCE!

May 11-13, 2011

Red Lion Hotel on the River–Jantzen Beach
Portland, Oregon

SOCIETY OF AMERICAN FORESTERS 1900

If you haven't yet registered for the joint OSAF/WSSAF Conference, don't fret, there's still time. Under the theme of *Keeping Forestlands in Forest*, the conference will take place May 11-13 at the Red Lion Hotel on the River–Jantzen Beach in Portland.

The meeting features an outstanding array of over 40 national, regional and local experts that will present new ideas on forest production, ecosystem services and markets, lumber and log exports, and public policies affecting forest conversion. The general session opens on Wednesday afternoon with a series of keynote presentations. Thursday features concurrent sessions that run on the half-hour so participants have the opportunity to mix and match program content with their interests. The annual SAF awards banquet will take place on Thursday night. Friday morning will kick off with breakfast and State SAF business meetings. The rest of Friday is reserved for technical field tour options including forest management, wildlife, forest products, ecosystem services, and forest inventory and analysis.

The meeting will also feature a poster session, exhibitors, a raffle to support the Foresters' Fund and other OSAF and WSSAF programs, and ample opportunity to connect with other resource professionals.

You won't want to miss this opportunity to join hundreds of natural resource professionals to exchange ideas, share professional expertise, and learn about the latest technologies and research, all with an eye on keeping forestlands in forest.

To download the conference program and registration form, visit http://forestry.org/oregon/annualmeeting.

REGISTRATION QUESTIONS? Please contact Michele Docy at 503-224-8046 or michele@safnwo.org.

We Remember

James Michael (Jim) Lee 1962-2011

Jim Lee, an Umpqua Chapter member and SAF member since 1999, passed away January 3 at his home in Tyee, Ore., after an intense battle with cancer.

Jim was born on Jan. 16, 1962, in Roswell, N.M. The son of a career United States Air Force officer, he moved with his family to Vacaville in 1976, where he played football, wrestled, pole-vaulted and sang in school choirs. He attended college in Utah and Idaho, earning a B.S. degree in Forestry from the University of Idaho.

Jim was a certified arborist and taught secondary science at several schools in Douglas County. He also was a wrestling and football coach. He worked for the Oregon Department of Fish and Wildlife and Douglas Soil and Water District, and was an independent stream and woodland restoration contractor.

With a profound respect for all wildlife, forests and riparian areas, Jim put incredible energy and expertise into supporting restoration efforts in Douglas County and throughout Oregon. He befriended many landowners who appreciated his help in fencing their streams, adding wood to their streams, controlling weeds, planting native vegetation, and thinning their woodlots so that oaks and other hardwoods would thrive.

Contributions can be made to a charity of choice in celebration of Jim's life.

Mark Savage 1952-2011

Mark Savage passed away following a car crash in New Zealand on January 24. Mark and his wife, Karen, were at the end of their five-week stay in New Zealand and were driving to the Auckland airport to return home to Olympia when a car crossed the median and hit them. Mark died being airlifted to the Auckland Hospital; his wife Karen survived the accident, although she sustained several injuries, and is now back home in Olympia.

Mark was 58 years old and a 17-year employee with the Washington State Department of Natural Resources. He worked for DNR as a Special Forest Products manager and Communication Site program manager. He owned and managed a Christmas tree farm called "Mudgee Tree Farm" and wreath making business, and even traveled to Denmark to bring over his own Danish noble fir tree stock. He was a Class 21 graduate of the Agricultural and Forestry Leadership Program and traveled to China and Vietnam. He was a member of the SAF Southwest Washington Chapter.

Mark was an avid timberland fire fighter working his way up to helicopter base manager as part of the DNR fire team; he spent time on fires in Alaska, California, Oregon, Idaho and Washington. He was an advocate and promoter of the natural-resource-based industries of which he truly loved.

He was a passionate fisherman and scuba diver. He was a beekeeper and had hives all over his property. He was very generous with his time and often taught school children about bees and was a regular guide at the Bob and Lynette Falkner Tree Farm in Pacific County. He was a great mentor to all those who shared time with him. He loved traveling with Karen to their new-found place for fun—New Zealand. He will be remembered as having an ability to live in the moment with a curiosity that was impossible at times.

Donations can be made to the Mark Savage Memorial Fund, Washington State Employee Credit Union Account #5874828; AgForestry Leadership Foundation, www.agforestry.org/; or Holden Village, www.holdenvillage.org. ◆

Calendar of Events

Politics Impacting World Forests and Forestry, May 3, Corvallis, OR. Contact: Starker Lecture Series.

The Global Forest Products Leadership Summit, May 8-11, Vancouver, B.C. Contact: www.forestproductssummit.com/.

Washington GIS Conference, May 9-11, Lynnwood Convention Center, Lynnwood, WA. Contact: Event Website at www.regonline.com/WAURISA2011 or 2011WAGISConference@waurisa.org.

OSAF/WSSAF Joint Annual Conference, May 11-13, Portland, OR. Contact: Bob Deal, general chair, 503-808-2015, rdeal@ fs.fed.us.

Annual Wildland Firefighter Refresher, May 13, Blyn, WA. Contact: Cindy Tonasket, 360-640-2660, cindy.tonasket@dnr.wa.gov.

OSAF Fellows Luncheon, May 19, Corvallis, OR. Contact: Jennifer Beathe, 541-929-2477, jennifer@starkerforests.com.

Capstone Field Trip-Log Export Facilities, May 20, Portland, OR/ Longview, WA. Contact: Starker Lecture Series.

Working in the Urbanizing Landscape, May 23-24, Beaverton, OR. Contact: WFCA.

Accelerating Structural Complexity in Douglas-fir Forests, May 26, Portland, OR. Contact: WFCA.

Oregon Urban and Community Forestry Conference, June 2, Portland, OR. Contact: Rick Zenn, 503-488-2103, http://oucf2011.eventbrite.com/.

TimberValue Seminar, June 7, Aug. 16, or Oct. 11, Beaverton, OR. Contact: FEC Consulting, 503-626-5726, timbervalue@forestmgt.com, www.forestmgt.com.

USFS/IDL Forest Insect and Disease Identification & Management Training, June 7-9, Coeur d'Alene, ID. Contact: Doug Wulff, 208-765-7344, dwulff@fs.fed.us.

Western Mensurationists annual meeting, June 19-21, Banff, Alberta. Contact: WFCA.

OSWA annual meeting, June 24-25, Baker City, OR. Contact: OSWA, 503-588-1813, www.oswa.org.

Advanced Insect and Disease Field Session, June 27-30, Klamath Falls, OR. Contact: WFCA.

Western Forest Genetics Association annual meeting, July 25-28, Portland, OR. Contact: WFCA.

Using ArcPad in Forestry, Sept. 13-14, Beaverton, OR. Contact: Atterbury.

Professional Timber Cruising with SuperACE, Sept. 15-16, Beaverton, OR. Contact: Atterbury.

Who Will Own the Forest? 7, Sept. 19-21, Portland, OR. Contact: Sara Wu, 503-488-2130, http://wwotf.worldforestry.org/wwotf7/.

Forest Products Forum, Sept. 22, Portland, OR. Contact: Bryan Doyle, 978-496-6338, www.getfea.com/component/content/article/210#fea_fpf_portland.

Inland Empire SAF annual meeting, Sept. 23-24, Priest River, ID. Contact: Dick Reid, IESAF Communications chair, rreid66519@aol.com.

SAF National Convention, Nov. 2-6, Honolulu, HI. Contact: SAF National Office, 866-897-8720, www.safnet.org/natcon11/index.cfm.

Contact Information

Atterbury: Atterbury Consultants, 3800 SW Cedar Hills Blvd., Suite 145, Beaverton, OR 97005, 503-646-5393 x10, dsandefur@atterbury.com, www.atterbury.com.

FEI: Forest Engineering Inc., 620 SW 4th St., Corvallis, OR 97333, 541-754-7558, office@forestengineer.com, www.forestengineer.com.

Starker Lecture Series: Oregon State University, 541-737-1585, http://starkerlectures.forestry.oregonstate.edu/starker-lectures.

WFCA: Western Forestry and Conservation Association, 4033 SW Canyon Rd., Portland, OR 97221, 503-226-4562, richard@westernforestry.org, www.westernforestry.org.

Send calendar items to the editor, *Western Forester,* 4033 SW Canyon Rd., Portland, OR 97221; rasor@safnwo.org.

Membership, Finances and Communications Get Attention at Council Meeting

BY CHUCK LORENZ, BOB ALVERTS AND LYNN SPRAGUE

Under the leadership of President Roger Dziengeleski, the SAF Council met at the national headquarters in Bethesda on March 4-6. Eighteen of 19 Council members and officers were present.

Friday, March 4 was devoted to Council committee meetings. The Finance and Investment, Audit, Strategic Planning, and Executive committees met at different stages through the day and evening.

Council continued its work on SAF's financial position, including the discussion of appropriate member dues, alternative funding sources and mechanisms, and membership. Historically SAF has been largely membership-dues funded. Dues revenue provided in 2010 were more than 42 percent of the operating revenues. A static dues rate (dues were last adjusted across the membership as a whole in 1997) coupled with declining membership has placed significant stress on SAF's financial position. Membership renewals for 2011 lag historic rates, at least in part tied to the economy. Members that have not yet renewed are encouraged to utilize the options for monthly billing. Contact Christopher Whited, whitedc@safnet.org, with specific questions.

In recognition of several recommendations from the House of Society Delegates (HSD), Council approved the appointment of an ad hoc committee composed of members of the Finance and Investment Committee, Strategic Planning Committee, and the Executive Committee with tasks of analyzing the several dues and membership incentives alternatives recommended by HSD and developing recommendations. The results of this work will be presented to Council at its June 3-5 meeting in Bethesda. Council also approved the development of a major membership initiative coupling incentives for member recruitment and enticements for becoming a member of SAF. Details will become available later in the spring.

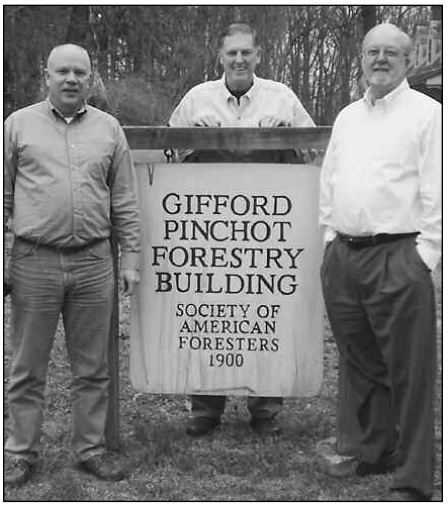


PHOTO COURTESY OF ERNIE HOUGHTON

Left to right: Council representatives Bob Alverts, Lynn Sprague and Chuck Lorenz.

On the student side, this spring will see the roll-out of the rings for forestry students graduating from accredited colleges and universities. National SAF staff is working with faculty representatives to identify the graduates and coordinate the ordering and delivery of the rings. A list of faculty representatives can be found at www.safnet.org/members/facultyreps.cfm. Faculty representatives and student chapter chairs are encouraged to contact Christopher Whited, whitedc@safnet.org, to assure the information flow.

On the policy level SAF continues to be active. The Task Force on Carbon and Biomass is on schedule to deliver its product for Council acceptance at the June meeting. Erica Rhoad has left the SAF Policy Director position. In the interim, Mark Rey will serve as a consultant to the Policy staff, which includes Kelsey Delaney and John Barnwell.

The year 2011 has been proclaimed as the International Year of the Forest by the United Nations and will be highlighted at the Hawaii Convention in November. SAF has been invited to join a proposed International Network of Professional Forestry Bodies. Council has approved continued dialogue with the organizers, but has not accepted the invitation to join. Also on the international front, SAF is evaluating the potential for holding its 2014 National Convention in parallel with the planned IUFRO meeting in Salt Lake City.

The deadline of May 15 is approaching for Presidential Field Forester Award nominations. Information on criteria and submission can be found at www.safnet.org/about/field_forester.cfm. The HSD requested Council develop an award for faculty advising/mentoring. Council has tasked the Committee on Professional Recognition to review and recommend criteria and procedures.

One continuing area of concern, as expressed by HSD, is communications between Council/staff and the state societies. The subject is a continuing source of frustration as additional communication tools have been developed over the past years including the Forestry Source, eForester, emailed Policy updates, and a revised SAF website. Council is particularly interested in member input to better manage our communications.

Beginning with this issue, the Council report will be the collaborative effort of District 2 (Oregon) Council member Bob Alverts, District 4 (the Intermountain West from Canada to Mexico) Council member Lynn Sprague, and District 1 (Washington State, Alaska and Inland Empire) Council member Chuck Lorenz. As always, we are interested in your thoughts for improvements and concerns related to SAF governance and operations. ◆

District 1 Council Representative Chuck Lorenz can be reached at 360-951-0117 or c_4str@yahoo.com. District 2 representative Bob Alverts can be reached at 503-639-0405 or balverts@teleport.com. Lynn Sprague, representing District 4, can be reached at 208-761-3492 or GLSprag@aol.com.

Northwest Forestry Leaders Selected

A new Oregon state forester and USDA Forest Service regional forester have recently been announced.


Doug Decker

On January 26, the state Board of Forestry selected Doug Decker, a Department of Forestry executive and leader of several major agency initiatives in recent years, as Oregon's next state forester. He assumed his duties on Feb. 1, succeeding Marvin Brown, who resigned effective last Dec. 31.

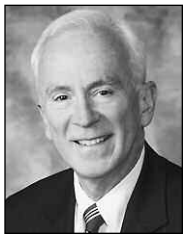
"Doug is an excellent communicator and understands the challenges facing the Oregon Department of Forestry," board chair John Blackwell said. "He has the skills to bring ODF into better alignment with a multitude of stakeholders, and to keep the department focused on its mission."

Decker, of Portland, most recently has been acting chief of the department's state forests division. He began with the agency in 1987 as a public affairs specialist, and served as public affairs director from 1990 to 1996.

He led development of the Tillamook Forest Center, an interpretive facility in the Tillamook State Forest, from 1996 to 2006. Most recently, he oversaw acquisition in Central Oregon of the Gilchrist State Forest, Oregon's first new state forest in more than 60 years.

He holds a bachelor's degree in journalism from the University of Montana. The agency has about 650 employees and a two-year budget of about $303 million.

On February 17, U.S. Forest Service Chief Thomas Tidwell announced the appointment of Kent Connaughton as regional forester of the Pacific Northwest Region. He will oversee 17 national forests and one national grassland within the states of Oregon and Washington. He had been serving as the regional forester in the agency's Eastern Region.


Kent Connaughton

Connaughton began his career at the Pacific Northwest Research Station as a forest economics researcher. During his 30-year career in the U.S. Forest Service, he has held assignments as forest supervisor on the Lassen National Forest in California, and deputy regional forester in the Pacific Southwest Region. Prior to being named regional forester for the Eastern Region in 2007, he served as associate deputy

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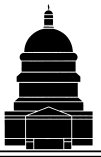

Policy Scoreboard

Editor's Note: To keep SAF members informed of state society policy activities, Policy Scoreboard is a regular feature in the Western Forester. *The intent is to provide a brief explanation of the policy activity—you are encouraged to follow up with the listed contact person for detailed information.*

Old-growth Position Statement Revision Adopted by OSAF. Oregon SAF recently adopted an update of its position statement on "Managing Mature and Old-growth Forests." A key objective of the update was to streamline the original statement, a task aided by the wide recognition now of the need for active management of public forests, particularly in drier forest types with high fire and health hazards. However, both existing and proposed policies for public forest management still often include individual tree diameter and/or age-based harvest constraints that confound the application of sound silviculture by forestry professionals. All OSAF position statements are available online, both individually and as compilation "A Professional View of Forestry Issues in Oregon," at www.forestry.org. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

Oregon Legislature Considers Green Jobs and Forest Management. Are jobs in the forestry profession "green?" Under a bill (HB 2840) introduced in the 2011 Oregon legislative session, it appears the state would formally recognize many forestry jobs as such. Although focused on the forest products and state investment in "green economy industries," the bill's definition of green jobs includes several criteria that match important benefits provided by the work of forestry professionals.

Other bills introduced in this session that may be of interest to OSAF members include several related to management of state forestlands (HBs 2001, 2597, 2598, 2736, 3350 and SBs 460 and 862). Two of these bills address issues of salvage harvest (HB 3350) and woody biomass use (SB 862) and also extend to federal and private lands concerns and interests. The text and current status of these bills can be found at www.leg.state.or.us/bills_laws/. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

Working Forests Position Statement Underway in WSSAF. In Washington, the Policy Committee is working on a position statement that supports working forests and includes a characterization of what is and what is not a working forest. Comments and recommendations are welcomed. Contact: Harry Bell, WSSAF Policy chair, harry@greencrow.com.

Idaho Forest Restoration Partnership (IFRP). During the March 2010 conference in Boise on Climate Change, Bioenergy and Sustaining Forests in Idaho and Montana, sponsoring partners, including SAF, agreed to form the IFRP to serve as an information clearinghouse for collaborative efforts designed to restore socially desirable conditions on National Forest System lands. In January 2011 the IFRP conducted a workshop in Boise on Collaborative Forest Restoration in Idaho. The IFRP has an excellent website, hosted by Spatial Interest LLC, with a schedule of upcoming events, and presentations, conference reports, and background material from the two events cited above: www.spatialinterest.info/IFRP.html. Contact: Jay O'Laughlin, IESAF policy chair, 208-885-5776, jayo@uidaho.edu.

EPA Involvement in Forestry and Bioenergy. Two court actions have put the U.S. Environmental Protection Agency (EPA) at the forefront of air and water quality concerns about forest management and wood bioenergy through the agency's regulatory responsibilities for the Clean Air Act (CAA) and the Clean Water Act (CWA). First, in 2007 the U.S. Supreme Court found that the EPA had authority to regulate greenhouse gas (GHG) emissions under the CAA. In 2009 the EPA declared that GHG emissions endanger human health and welfare, paving the way for new regulations on tailpipe and smokestack emissions. The treatment of GHG emissions from burning biomass for energy purposes is at issue, and in January 2011 the EPA deferred for three years a decision on whether and how such emissions may be regulated while the issues are studied. Second, the EPA's interpretation of the CWA has traditionally considered runoff from silvicultural operations as nonpoint sources of pollution. In August 2010 the 9th Circuit Court of Appeals overturned a district court decision in NEDC v. Brown, a case involving state forest land management in Oregon. If this decision holds, the EPA will be required to issue permits for silvicultural operations, adding a huge burden on the agency that seems duplicitous with state forest practices acts and promises to increase the cost of forest management. Contact: Jay O'Laughlin, IESAF policy chair, 208-885-5776, jayo@uidaho.edu.

Forestry Day at the Idaho Legislature. In January 2011 the SAF and partners provided an information luncheon for state legislators and other public officials. This was the 14th consecutive year that SAF has provided such a forum for Idaho's state legislators. Dr. Kurt Pregitzer, Dean of the University of Idaho's College of Natural Resources, gave a brief overview of the college's bright future. The program featured two presentations on the 9th Circuit Court's decision in NEDC v. Brown (see above) by forester and attorney-at-law Bob Maynard of Perkins Coie LLC, and Mark Ryan, attorney-at-law and CWA expert in the EPA's Boise office. Contact: Jay O'Laughlin, IESAF policy chair, 208-885-5776, jayo@uidaho.edu. ◆

Two Students Receive WSSAF Foundation Scholarships

BY PETER HEIDE

The Washington State SAF Foundation is pleased to announce that Candra Grimm and Angel Johnson are recipients of the first annual WSSAF Foundation $1,000 scholarships.

Candra Grimm

Candra Grimm is a superior student in the Forestry Technician program at Grays Harbor College. She has completed her Associate in Arts degree for eligibility to transfer to a four-year institution. Her immediate goal is to finish work toward an Associate in Applied Science degree to get practical knowledge and experience in preparation for a career in forestry. Candra is eagerly looking forward to entering a natural resources or forestry program at a college or university in 2012. With her record of community service and leadership, the foundation board has high expectations for Ms. Grimm's future.

While supporting her family as a single parent, Angel Johnson maintained an excellent grade point average in the Natural Resources Program at Green River Community College. Her college pathway put the forestry program first and she is now pursuing a professional transfer degree with plans to attend the University of Washington in 2012. The foundation board saw Ms. Johnson's leadership in SAF student chapter activities, and attendance at two WSSAF-OSAF leadership conferences and the SAF National Convention in Orlando as an indication of her strong commitment to the forestry profession.

Angel Johnson

Congratulations to these young women. Each will receive a complimentary student membership in SAF along with their scholarship.

The first full year of operation for the WSSAF Foundation has been a learning experience for the board. We have seen that the financial need of today's student is greater than ever, and that many of the best prospects for a professional forestry career start out in their local community college.

In 2011 the board is embarking on our first major fund raising effort. We want to increase the size and number of scholarships we can provide. The Foundation will be offering opportunities to contribute to an annual fund for current scholarships, and will also be asking members to consider lending support to a future endowment that we hope someday will provide a steady stream of scholarships to grow our profession. ◆

Peter Heide is Board of Trustees chair for the WSSAF Foundation. He can be reached at pjheide@comcast.net.

NW Forestry Leaders Selected

(CONTINUED FROM PAGE 21)

chief for State and Private Forestry in Washington, D.C.

He holds a Bachelor of Arts degree from Stanford University, a Master of Forestry degree from Oregon State University, and a Doctor of Philosophy degree from the University of California, Berkeley. He is an SAF member and was elected Fellow in 1991.

He began his new assignment in April. ◆

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THE LASER TECHNOLOGY SURVIVAL GUIDE TO FIELD WORK

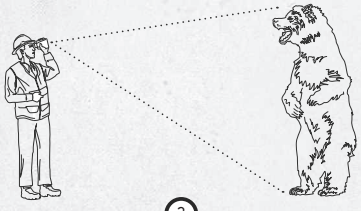
SURVIVING A GRIZZLY BEAR ENCOUNTER

1

Use your TruPulse laser, in distance mode, to see how far away the bear is.

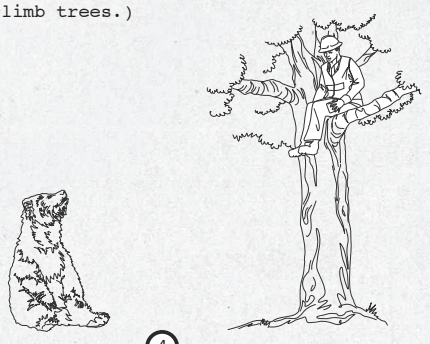
2

From that data, decide if you should run, or if you need to climb a tree. (NOTE: Make sure it's a grizzly. Other bears climb trees.)



3

If you chose to climb, measure the bear's height using your TruPulse's height routine.



4

Climb a tall enough tree and hang out until the bear gets bored and leaves. (NOTE: To pass the time, measure the height of other surrounding trees.)

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