

Cacapon

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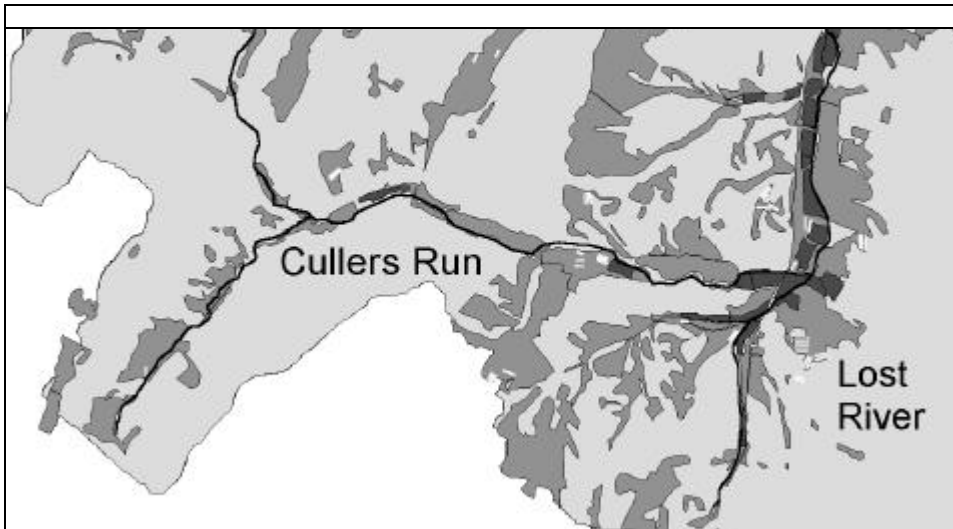
GIS up and Running at CI

There is nothing quite like a map to clarify the world. Like a picture, a good map is worth a thousand words. We are pleased to announce that Cacapon Institute's computerized Geographic Information System (GIS: *see box page 2*) is now up and running. More importantly, it is being used to develop information critical to interpretation of our water quality data.

Our water quality studies are designed to answer specific questions. One of the most important is: do streams with different land-use characteristics have different

While a great deal of land-use data is available in GIS format, the vast majority of this information is interpreted from satellite data and is known to be inaccurate in certain key areas. While the accuracy of this data is constantly improving (see The University of Maryland's Mid-Atlantic Regional Earth Science Applications Center website at www.geog.umd.edu/resac/ for further information), we decided that existing information was not yet accurate enough for our purposes.

A particular problem with satellite im-



Map of the Lost River headwaters region. Rivers are in black, row cropland in dark shapes, other agricultural lands in medium tone shapes, and poultry houses are light colored bars. Background area is mostly forested.

nutrient (nitrogen and phosphorus) and bacterial concentrations? For example, are nutrient levels in mostly forested streams any different than streams in watersheds with lots of homes or lots of cropland? This question demands an accurate understanding of how land is being used in our study watersheds.

aging data has been in discriminating row crops from pasture and hay fields. Since row crops such as corn and soybean typically receive more fertilizer than grasslands, any study relating nutrients in streams to land use requires accurate information in this area. A study by the WV Division of Natural Resources several

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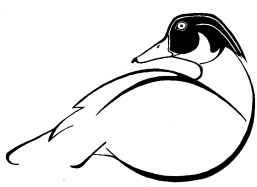
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See our new Interactive Maps at

www.cacaponinstitute.org



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Cacapon Institute

Is a nonprofit corporation dedicated to using science and education to help people protect and enjoy the Cacapon, Potomac and other Appalachian watersheds

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years ago (Paul Kinder, personal communication) found that satellite data incorrectly identify cropland nearly 100% of the time in central WV. That is obviously not good enough. This problem occurs because droughty soils formed over shale appears very similar to bare crop fields in aerial and satellite photography.

CI's Research Assistant Nicole Navis spent long hours manually *digitizing* land-use information from aerial photography into the computer and verifying coverage information

in the field, but the effort has paid off. We now have by far the most accurate information available on land-use coverage in the Lost and North River watersheds. This offers a depth of understanding never before possible. At long last we are able to make detailed comparisons between our study sites.

GIS is a powerful tool that gives us the ability to very accurately map out land uses and link other information, such as water quality data from our research programs, to that geographic data. It also is a powerful presentation tool. We will be using our website (www.cacaponinstitute.org) to publish land use maps for all of our study sites in the Cacapon watershed. Please come visit, we think you'll find it as interesting as we do.

Digitizing is the process of converting features on a paper map or photograph into computer format. When you digitize a map, you use a digitizing tablet or computer mouse to trace over features of interest, such as fields, roads or even telephone poles. The location of these features are automatically recorded and stored as geographic data.

We could not have undertaken this work without a lot of help. Canaan Valley Institute (CVI) has been one of our key partners, providing training courses in GIS and mentoring through the often compli-

cated world of computerized GIS. CVI also provided funding to complete the land use analyses started under our water quality study contract with the US Fish and Wildlife Service. The

USDA-Natural Resources Conservation Service has also played a key role by providing access to their infrared aerial photographs and help in learning to interpret the images. The ArcView GIS software was donated by Environmental Systems Research Institute, Inc. The Norcross Wildlife Foundation provided funding in 1999 to modernize our computer infrastructure, making not only GIS work but also in-house publishing and development of our website possible. Finally, funding from The MARPAT Foundation for educational initiatives supports the costs of developing and maintaining our website.

We are grateful for their support!

What is GIS?

When people talk about "GIS" they are usually referring to software that lets people use map information in a computer. In fact, any map is a form of GIS. At your county courthouse, the tax maps (geographically referenced data) and associated ledgers (attribute data like name of owner) are a form of manual GIS and, while providing useful and accurate information, they are typical of manual systems in being difficult to update and time consuming to use. Once the information is computerized we can manipulate it far more quickly than was the case prior to computerization. To see how easy it can be, visit <http://206.246.204.40/public/index.htm> on the internet to explore Hampshire County's new computerized tax maps system. You can find the owner of a parcel just by clicking on the map. Try it sometime.

Computerized map systems offer extraordinary advantages. For example, we have soil maps of our watershed with linked data that tells us anything from the name of the soil to its slope and suitability for agriculture. We can quickly answer many research questions like, "What percentage of the Cacapon River watershed has a slope greater than 45 degrees?"

Land Donated to Institute

Late last year, a long-time area property owner donated 54 scenic acres of river-front property along West Virginia's Cacapon River to the Cacapon Institute (CI) and the Cacapon and Lost Rivers Land Trust (CLRLT), two WV non-profit corporations. Bordered on three sides by the river, this forested property is wonderfully diverse, containing habitat ranging from high shale cliffs to floodplain and upland forests.

The two recipient organizations, the CI and CLRLT, offer very different but in many ways complimentary services to the Cacapon watershed. The CLRLT (profiled in the March 2000 issue of *Cacapon*) has been working with landowners since 1990 to support voluntary private land protection that sustains the region's farms, forests, open spaces, cultural heritage and the community's economic vitality. Since 1985, CI has provided reliable, objective scientific information and community education to help people living in the Cacapon, Potomac and other Appalachian watersheds make informed decisions about issues that affect their watersheds and rivers. Lately, CI has been working on a project to help local farmers become profitable by developing a niche market for "eco-friendly" beef, with the goal of sustaining the region's farms, open spaces, cultural heritage and protecting water quality (see Headwater Farms Petite Beef Project Update below).

After discussing options for the property, the two organizations agreed on two priorities — insuring permanent protection for this exceptional property and raising funds to support the missions of both organizations. We jointly decided to place a conservation easement on the land and then sell it. The terms of the easement provide hunting, fishing and other recreational opportunities for the owner and preserve the scenery offered by this property for future generations.

The donor of this land was a triple winner - he supported two community non-profit service organizations, he received a

tax write off for a charitable contribution and, in the end, the property he loved was permanently protected from development by the recipient organizations.

For more information on donating land, contact Neil Gillies (CI Director) at 304-856-1385 or pcrel@mountain.net.

Headwater Farms Petite Beef Project Update

We are pleased to announce that customer response has exceeded our expectations for the first year. Over 70 individuals and families, including many members of Cacapon Institute, have chosen to purchase Petite Beef by Headwater Farms (HFPB) and become "**partners in the process of change.**" That phrase may sound like an advertising gimmick, but it is really true. The enthusiasm of customers for the program has demonstrated to the participating farmers that moving ahead aggressively on river friendly farm management protocols is a good business decision. As a result, participating farmers, Cacapon Institute and farm management experts from the USDA-Natural Resources Conservation Service, WV Department of Agriculture and WVU Extension met in September to begin the process of developing farm management protocols for Headwater Farms products.

These protocols will lead to a certification of farm management practices for participating farmers. Some specific protocols under discussion include rotational grazing practices, supplementary feeding and streamside fencing.

Partnerships of many kinds have been at the core of this program from its conceptual origins in the mid 1990's as the WVU Extension's cattle pool concept and Cacapon Institute's "Riparian-friendly Beef." Partners at present include CI, WVU Extension and Animal Sciences, Gourmet Central, USDA-NRCS, Hampshire County Development Authority and, of course, the participating farmers.

See our website at www.cacaponinstitute.org/hpb for complete details.



Headwater Farms Petite Beef:

- Supports family farms
- raised on pasture without adding hormones or antibiotics
- naturally lean
- produced in an environmentally friendly manner.

What Customers are Saying.

"It's a genuine community project with ecological impact... Good farm management makes a good beef product...I am happy for the chance to purchase beef locally-hence having knowledge of the chain of production...I like the goals and accepting responsibility for long-term effects of what we consume and produce... Low-fat, hormone-free, humanely raised, tender beef should be a highly desirable product in a number of areas in the US."

A Preview of "Economics and Beyond: Riparian Buffer Zones in the Potomac Highlands"

(First in a series of Science and Society Papers to be published on our website.)

Non-point source pollution is often cited as the primary source of stream contamination in the US, and in rural landscapes agriculture is often identified as the main cause of non-point source pollution. The Potomac Headwaters are no exception. Data indicates that runoff from our region's farms contributes significantly to sediment, nutrients, and bacteria in rivers.

One of the tools recommended by agricultural agencies to reduce water quality impacts from agriculture are riparian (riverside) buffers. These buffers are typically a band of trees, shrubs, herbaceous cover or grasses at least thirty feet wide planted along a stream bank. Such a band can trap sediment, and absorb nutrients from both surface and sub-surface flow. Riparian buffers have demonstrated their effectiveness in controlling agriculture-related non-point source pollution.

Agriculture in the Potomac Headwaters, thanks to Appalachian topography, occurs largely in narrow valleys and on gentle slopes. This results in a large ratio of stream bank length to farm acre. Thus, topography has increased the sensitivity of farmers to installing and maintaining riparian buffer zones on their best agricultural lands.

Currently government programs rely on cash payments to compensate farmers for taking land out of production and installing

and maintaining riparian buffer zones. However research shows that economics is only one element of a complicated framework farmers use in making land use decisions. To the extent that compensation-oriented programs ignore other factors, these same programs may be overly expensive and underutilized. This could be especially true for an area like the Potomac Headwaters where topography increases the need for riparian buffer zones but makes farmers more cautious about getting involved in buffer zone programs.

With this in mind, our inquiry is looking at 1) considerations, over and above economic compensation, that keep farmers from taking advantage of riparian buffer zone conservation programs, and 2) under what circumstances might farmers be interested in increasing the extent of appropriately designed riparian buffer zones on their land. It is our hope that this information will focus additional conservation effort and research on devising riparian buffer zone programs that could work in the Potomac Highlands.

Peter Maille

This will be the first in a series on papers dealing with the interface between science and society. These will be published on our website and available as hardcopy on request.

The Rock, The River, The Tree, and Me
By Charles N. Tripp
First came the rock: then the waters formed
To make a river flow.
After some time—voila—there was a tree!
All these events made it possible for
The here to be me!
If I don't take care of the rock the river,
And the tree,
Alas and alack—who will take care
of me?

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