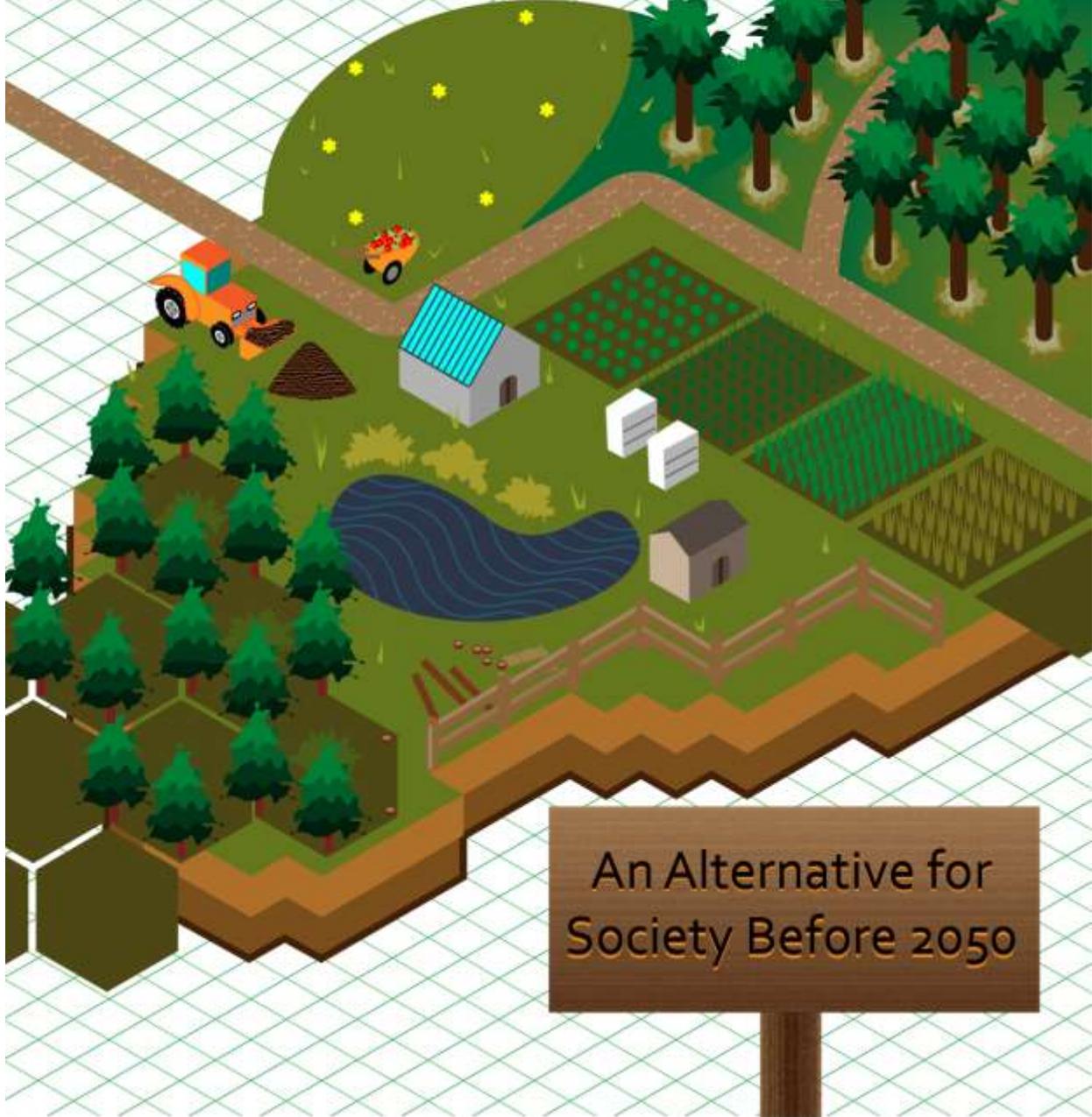


RURAL FUTURE



An Alternative for
Society Before 2050

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By: Robert H. Giles, Jr., Ph.D.

Edited by: Laurel Sindewald

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Troll: A Story about The Whole Thing

I've tried in many ways to tell different people about Rural System and have never felt successful. Here is another way I've told about it, as if it were real and functional.

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H. Rain Jacobson inherited land, and did not know what to do with it. Now, living in San Diego, she thought about selling. There was said to be a new option, Rural System, so she hired them to give it a try. After Rural System had been active for several months, she called Brother to check in. Brother knew nothing! He didn't know how he got the name Brother or what to do, much less why he had been excluded from owning 60 acres of mountain.

He did as was told, drove to the town near the Jacobson property and in a slit between two steep mountains, got a coke and searched the street for the Rural System office. He couldn't find it, but after talking to several locals, he discovered that everyone knew where it was: behind the red restaurant. That's where Brother met Joe, a representative of Rural System and not gloomy like the town. They went to an office nearby where Brother was shown maps, computers, files, books, and people working over keyboards. He was given a hat; the day was heating up.

They drove through a newly-built gate, like one from a Western ranch. They hit a bump in an otherwise smooth road, providing air bag pressure to a giant rotating wheel, producing some electrical energy for this end of the property. Joe explained that this unusual system was combined with the methane units, producing electricity and reducing year-around fuel and electrical costs.

"What's that white stuff? It looks like a baseball-field line," Brother asked, glossing past the bump in the road.

"It's the boundary of one of our management units, 10 meters by 10 meters. It's like the distance between football field lines. We usually ask visitors to guess about its size or what part of an acre it is."

"Who cares?" thought Brother, but it seemed harsh so he said nothing.

"There are about 40 of them in an acre and so there are 2,403 of those little devils, all unique, in Ms. Jacobson's land," Joe continued. "We use computers to tell them apart and try to treat them with personal respect."

Brother exclaimed, incredulous, "Surely that's asking too much!"

"It once was, but now with satellites and computer power, we know about 100 things about each of them. We have the power to restore them, enhance them, manage them, and predict their likely productivity. We can even attach local market prices to the produce from each." Joe shifted gears, and continued, "We have picked 8 spots for vegetable gardens based on soil type, soil richness, slope, nearness to roads, elevation, forest shade, aspect, past use, and wind patterns, all adjusted by the expected effects of climatic change. We have begun building the carbon structure in the soil by modest dragging after plowing, adding mulch from nearby forest stands, crop selection, crop rotation, and compost additions from legumes. Our Pest Force protects the crops, and we anticipate that crop harvests by our Land Force will put us in a profit stream for years to come."

Brother was almost dismissive, objecting, "That's far too complicated! I can't 'precisely manage' even a kid's basketball team." Joe simply smiled, used to peoples' amazement, sometimes skeptical and other times jubilant, when hearing about Rural System for the first time.

They turned a bend in the road. A covey of bob-white quail flushed. This field, full of triangular areas with brush borders, held more of these game birds than any other for miles around. Joe broke the silence again, explaining, “The Quail Group manages these fields, as well as hunting dogs available for rent. They work the patterns of the field for high insect numbers for quail chicks, and use a special technique to keep the stems of the grain the quail like to eat from falling over in the snow. Several hunters pay well for an opportunity to use their dogs with a known population of quail.

“Out of season, we have a great doggie play area within the fence. Visitors pay a small fee for each of their dogs to use the area. We are wary of diseases and do not compost dog waste material, but use it in our methane systems for electricity. You can see we have changed a conical “sink-hole” into a small amphitheater, and partial garden. The garden produces seasonal flowers for sale. We bring van loads of visitors here for our Group presentations, all with modest fees and our presentations of other opportunities here.”

Out of sound range, in a wooded grove, was a memorial area beside a giant rock face. This was provided to people wishing a beautiful, secluded place for placing the remains of family and friends. A perennial shade garden provided seating at one side, giant wooden benches built from thinned trees of the property.

Joe pulled over, parked the truck, and pointed: “The Rain Jacobson Place” was laser-carved into a large sign mounted in rock. He said, “These are made of wood from our forest, processed into desired shapes, and messages routed, burned, or laser-carved into them and then walnut-stained from our “waste” walnut shells. Our walnut groves are popular; our Walnut Vales Group produces nutmeats, shells for burnishing metal, wood for furniture, and dye. We anticipate using computer-selected areas for storing and drying cut walnut, some of which may be used within our Sculptor's Group.

After a drink from the truck cooler, Joe showed Brother a road-building guide, sent as a prescription from the VNodal software program. The two hiked off on a narrow, built trail. Flower patches that had been moved from the tread area diversified the trail sides. Designed for reduced erosion, the trail made the forest and fields open, available, easily seen by visitors and accessible to staff, the Land Force. One sunlit area here was a fragrant garden, another was a bee garden, there, down the trail, was a “xerosere,” an area with only dry-land-tolerant plants and rocks. A branch trail led to a road, a small parking area and a fireplace with stacked wood.

“Why is that fireplace there?” Brother asked.

Joe smiled, and said, “About once a month the Owls Group brings a bus of interested people from town at dark, walks them into the woods along that little trail, and plays a recording of real owl calls. The owls are well-studied here by students and they know what to expect. Everyone gets a tingly feeling, some are a little scared, and some rent night-vision equipment to see the owls called in. Afterwards they retreat to the fire place, hear a local guitarist, enjoy a drink and fireside fun, and are bussed back to town, all having had a unique experience in the deep-dark-forest of Rain Jacobson's Place.”

Around the bend, after looking at a vista, Joe and Brother almost hit some of the Land Force in the road. Half were talking, lounging on the road bank, and chewing on grass. One wore an elaborate safety emblem on his shirt. They looked “caught.” The others stood holding shovels and fire-rakes. They had been improving the rainwater flow off the road. “Hi, Troll!” said several.

Brother looked around. Joe yelled, "I'll be right there," then told Brother to "check it out," and handed him the tablet, adding, "we're at 3,300 feet." Brother was thinking about the name, not the vista. Troll seemed an odd name, about as odd as "Brother."

The Land Force gathered around and all talked at once. They were introduced and wanted to share their progress over a few days, including the poisonous snakes added to the database with the exact Alpha Unit where they were found. They moved up the mountain to an equivalent spot, marked the place for a new trail, and marked the places for three cultivated areas, each for different grains to attract song birds near to observers.

"Troll says resources are for people and just increasing birds or creatures up here has no known payoff. Our birds are not a resource unless we provide access. That's why we're up here today."

Troll grinned approval.

"Where did you get that nickname, Joe... Troll?" asked Brother loudly. Everyone grinned. A large woman, laughing a little, said, "I'll tell.

"Three of us drove up the north mountain side to the trout stream. We had put in a hydraulic ram for a sales demo near a road. We piped a little water from the stream to the ram, and the ram spewed it back up the hill into a marsh area, a 'seep' for the Wild Turkey Group. Suddenly, out from under a tumble of trees and limbs that had washed down into the stream from the upper banks crawled Joe. No one could believe it. He said that he was after a winter wren sighting. That sounded odd, but he insisted.

"Two days later we were weeding a north-facing winter-berry garden by a trail side and walked around the trail. Out of a tree-trunk came Joe, as if it was his home. He had been with The Bear Group the previous year and wanted to see if he fit where the tagged bear had been found. He's just odd like that, our Troll.

"But the name came one day when we had a truck load of visitors. They had seen bear tracks, and had spent the morning in a blind in which people paid to observe their first-ever wild turkey to add to their bird life list. As our truck rounded a corner, we approached a bridge. Out from under the bridge came Joe, sweaty, wet, dirty, and covered in lichens and algae. Someone in the truck called out, 'My God it's a Troll!' We've called him Troll ever since."

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Let's take a hard look at how Rural System works, based on the story. Income came from timber thinning, sales of equipment (such as the methane units), field guides and related books and photographs, guide services, special events (such as the Owls Group experience), birder life-list visits (turkey), back-country road design, and GIS services. High country coolness and mountain shade had cut potentials for commercial vegetable production.

Brother was not a rural person and did not understand Troll or the strange things that the men and women of the Land Force did. He was glad to get home. Rain decided to visit later and see her place for herself. In the meantime, she enjoyed a percentage of the annual profits being raised, and appreciated the increase in her land value, as well as a modest tax break.

Chapter Nine

Rural System's Ranging

Like other words, the word, “ranging,” may be used as a verb, a noun, or an adjective, e.g., as in, “That's our ranging budget for *the whole group* next year.”

As other units of Rural System, this chapter presents ranging as a proposed, large, diverse activity and enterprise, one that intends to help stabilize and improve the lands and waters of a region for high quality, diverse outdoor recreational and viewing activities. There is nothing special about a word like *ranging*, unless it can help make sense and suggest positive structure for the expansive areas of outdoor recreation, ecotourism, agri-tourism and related words and phrases for region-changing action.

“Ranging” in Rural System means engaging in one or more of a diverse set of outdoor or rural activities for health, recreation, study, appreciation, and adventure. The term may also encompass related enterprises that promote, support, and supply these activities and the areas and resources used. Ranging includes (but is not limited to) hiking, backpacking, camping, trekking, climbing, biking, trail riding, hunting, fishing, boating, touring, sightseeing, studying nature, and observing wild flora and fauna. It may later include triathlon events and their observation and support. In Rural System, ranging is the total system of activities that manages the land for people, and their need for increasingly diverse outdoor activities for the long run.

Rural System's **Ranging Program** will market the set of rich resources of the managed properties, create related sales and services of equipment, clothing, food, lodging, and supplies; offer guided tours and unique experiences; develop new organizations with lasting memberships; and attract gifts, bequests, and research projects. The tours will protect the land and owners' resources, and provide opportunities for students for work experience and education, funds for tuition, and graduate research opportunities.

Rural System's Ranging Program will develop and promote a wide array of outdoor activities for a region. The “catch,” the colloquial difference emerging, is that for such a program to be very successful and pay off for the region, *the region* must be beautiful, safe, and carefully managed for the long-run. It is not easy to maintain such standards, but ranging may have great payoffs in human health, reduced costs and risks, employment, regional stability, and high quality of life.

Ranging has a major component of “outdoor recreation.” Nationally, outdoor recreation is an economic powerhouse, generating \$646 billion in consumer spending and 6.1 million direct jobs annually. In Virginia alone, the estimated consumer spending on outdoor recreation is \$13.6 billion in spending, 138,000 jobs, \$3.9 billion in wages, and \$923 million in state and local tax revenue.¹

Ranging is a proposed, new combination of diverse activities with nameable results that can be used to paint a region as “beautiful” to sightseers and guests, rich in outdoor activities of

¹ Outdoor Industry Association. 2013. The Outdoor Recreation Economy [Internet]. [cited 2017 Apr 22]. Available from: https://outdoorindustry.org/images/ore_reports/VA-virginia-outdoorrecreationeconomy-oia.pdf

many kinds, and a place for adventure, self-testing, exercise, and even self-discovery or quiet reflection.

A cost-effective ranging program implies enacting diverse, progressive ranging-related enterprises in a well-managed environment. The enterprise and collective resources will build over time, providing profits and associated benefits in employment and community stability.

Rural System is planned to begin in Southwest Virginia before expanding nationally, and eventually Earth-around. As an example of ranging potentials in Southwest Virginia, the New River watershed includes one of Virginia's 14 major rivers. The New River starts in North Carolina. Its waters flow northward toward the Missouri, then southward into the Gulf of Mexico. With fuzzy borders of the area, people in Virginia are within one day's drive from 50% of the U.S. population! The region is expanding for worldwide activity. Of course, the Internet and related e-commerce automatically achieve part of that work.

Land may be a forest today, but that can change tomorrow. Fields of tobacco, once planted, tomorrow will be another crop. Lands may be mined and flat today; tomorrow, formerly mined land may be the site of a booming economy. It may be where ideas and creative expression arise. Land can be covered by the deep water of a pond, a camp site, a corn crop, or a shopping center. While certain things may not be suitable for a tract of land, trees are rarely the only thing for which any tract is uniquely suitable. Trees are thus a decision. Trees have no intrinsic "right" to an acre. Ranging land can be considered to exist as a mappable, working platform, and Rural System will promote the best possible uses for each Alpha Unit.

What's the Deal?

While not competing with existing enterprises, Rural System is likely to increase the markets and profitability of existing recreation, sport, and outdoor-related enterprises. All of these require a high-quality environment, conditions that attract people and please them enough to inspire a return or to share discussions about their positive experiences. Some sports require special conditions, but they all benefit from a beautiful regional experience, pleasant interactions with people, and reasonable services.

There's been much state and federal agency work on large and small public areas, foundation support, and enormous amounts of volunteer effort and time spent to preserve and manage public natural recreation areas. That work and thought underlies the planned actions of each ranging program. Public agency work has been essential, but is now uncoordinated, piecemeal, and adrift within public challenges for greater private use, lower expenditures, and other limitations.

Rural System plans to launch related business enterprises, such as clothing and equipment for ranging activities. Proponents of outdoor recreation and its economic impacts list supportive fields and count their full contribution to the production of income. Sources range from matches to motors, beer to binoculars. Changes in economics, agencies, and policies in the U.S., indeed the world, indicate that alternative strategies may be worth discussing... even necessary.

Current conditions suggest reduced tax support for natural resource agencies, loss of experienced staff, increasing environmental problems for which there are no apparent solutions and only long-term maintenance costs, new public awareness (but poorly informed) about human dependence upon a healthful environment, and new demands for "cleaning up" after past misdeeds. There are increasing *urban* populations, most having little understanding of changing

rural conditions, practices, or limitations. Farming conditions and the employment in rural regions today change daily, influenced by globalization, urbanization, family relations, emigration, and technology. People are leaving rural areas, in part due to this instability, and the support and service structures are disappearing. Ranging staff can help slow and reverse those trends, and tend-well innovations for the remaining rural land.

Ranging is not just a bunch of activities but a dynamic system that can be analyzed, designed, operated, and maintained for the long run. “For the good of the environment,” or, “for the good of the animals,” are essential concepts, but foremost is, “for the good of people and their region.” When a system is designed, and operated for the good of people into perpetuity, all of nature must be included and tended with great care to assure that the desired future conditions occur. Ranging can unify outdoor recreational activity with superior modern land and natural resource management to achieve lasting stability.

We suggest caution, however, and have prepared notes on tourism limits. There are mixed messages and caution flags in developing ranging as a singular line of investment. It can “work,” but only with very careful planning and skillful implementation, concentrating on full costs. We strongly support limited, careful efforts and enhancement of the activities now underway, but suggest time and effort be devoted to a diverse, inclusive set of activities, those most consistently profitable. We study “scale,” because a baseball game does not create a stadium. A large, diverse effort will attract ranging potential and regional success.

There are many ways to express profits, ways to move past the economic margins, and new ways to gain synergism or team benefits. Cost-effective strategies can be developed and the effects of decisions simulated before they are made. Optimum locations can be computer-selected for things that are *line-like* (e.g., utility corridors), *point-like* (e.g., offices, factories, plantings), and *area-like* (e.g., effects of a tax or policy).

Although Rural System staff are prone to wish to protect or save the region's natural resources, we are more prone to concentrate on *managing* those resources because some now need restoration, then enhancement. Improved human food supplies and water quality are repeating topics within this book. They are the essence of our beautiful rural landscape. Of the areas we do protect, there are ways to make profits from them still, and these are a part of Rural System tactics for the long-run.

Just Imagine with Us

Please reflect on the current regions of Virginia and those of adjacent states, potentially seen from highways. Think of all those diverse forests and rangelands, with fishing, hiking, and related activities throughout the region for tourists and visitors, citizens, land owners, and the overall wellbeing of the people of the region and neighbors.

Also, imagine:

- productive pastures and forests as scenery;
- people discussing Rural System Ranging as *a single destination* of diverse activities and experiences;
- publications, Internet units, and banners that tout things included that are *new* in the area;
- the region itself taking on a sense of newness, becoming the total system like a historic birthplace: that of Ranging;
- quality outdoor activities in a vital, improving region, with a new 150-year plan;

- becoming a member of Rural System, sharing profits from 30 or more ranging-related small businesses, managed by a for-profit alliance of existing and new private enterprises; and
- podcasts about new ranging opportunities and YouTube presentations of developments and challenges, successes in wild fauna management, seasonal wildflower trips, and local pasture beauty.

The Ranging Program advertises the region itself, along with its activities, as it seeks to make profit from all enterprises. By working together, enterprises achieve scale, scope, sequence, central services, and synergism, overcoming hundreds of recreation business losses in the past.

None of the enterprises suggested for Rural System, Inc. are more important than any other. All, by design, are related and supportive and benefitting. They perform together as a single, carefully-managed system, prepared for the often-needed rural recovery, resilience, and confidence-building.

Individual participants, with their lands and waters within Rural System's Ranging Program, might reasonably expect:

- A measurable increase in the budgets of at least 10, select, related businesses;
- National and state promotion;
- Two annual season fairs;
- An increasing regional Visual Quality score;
- Noteworthy improved farmland members;
- Increased avian diversity; and
- Abundant local school presentations and contests.

General, related activities include:

- Gaining controlled access to natural resource areas;
- Improving communication among local environmental and conservation groups;
- Building a local information system for participants;
- Describing and promoting a land-use ethic;
- Directing charitable funds toward local studies and research;
- Improving services, safety, security and deliveries to visitors in various lengths of stay;
- Demonstrably valuing cultural diversity;
- Managing access to small, remote designated “wild” areas;
- Predicting public interests, and expanding activities and opportunities;
- Studying and gaining improved, computer-based human health indices;
- Describing and reporting changes in visual differences in landscapes; and
- Actively matching human interests with available resources.

Rural System will provide cost-effectiveness for all Groups, and stability for some activities that are seasonal and affected by storms, fires, etc. (even skating on ponds). It directs the work that is designed to provide strong financial incentives for superior, long-term, private rural land management.

What's new? Why “Ranging”?

The needs for Rural System seem clear and, while the ideas herein are not new, the purposefully *combined and integrated* applications suggested *are* new. The advantages for a state or region are evident as problems are addressed within a single system, an entire region working together for its own good and for the future. New today, the innovations, discoveries, and applications that will arise from the exciting, changing interplay of the proposed enterprises and activities will themselves provide the motive to see and experience, “that dynamic, creative *ranging place*.”

The modest objective of creating Ranging within Rural System is to benefit the people of the region for at least a 150-year planning horizon, shifting forward one year each year. To do that, the objective is to create and operate a for-profit enterprise that will set standards of excellence in resource management in the region, increase employment, stabilize communities, and increase benefits to landowners and citizens... then expand widely. A proportion of the profits will be devoted to key improvements on private rural lands. The sketched results sought include:

- Employment of about 150 people;
- Products, profits, and taxes from 30-50 small businesses;
- Modern Crescent management;
- Innovative, diverse ecotourism with memberships in new organizations, new nature “sports,” and new educational events;
- Integrated deer damage management dealing with auto-strikes, threats to endangered plants, and crop-loss;
- Computer-based land management games and educational units;
- Various housing and services for visitors;
- A modern, complex, total fishery; and
- Specialized product sales and branding within the Rural System **Marketing Group**.

Over 50 components of the Ranging Program together result in a new, dynamic, public-private partnership for rural regions, first in Southwest Virginia.

Southwest Virginia, as many other rural areas, is beset with problems and needs in an ever-changing political environment. Pressures increase from an increasing, new set of diverse users whose interests, values, knowledge, and wish for outdoor experience is now very great. There has always been uncertainty about rural land management and what complete naturalness (a hands-off concept) may mean when contrasted to various levels of manipulation, control, intervention, or even restoration to achieve some previous state. The region is beset with these and other problems, for set-aside lands now need management. Rural beauty is seen in some pastures and unless these are carefully grazed, pastures become eroded or revert to forest-sameness. Southwest Virginia is probably already experiencing problems of the types and magnitudes likely to be experienced by other national rural communities in the near future.

The region and its people need help now to stop or slow the loss of farm families, assure a tax base for local children, provide quality conditions for tourists, offer jobs, and assure local people lasting advantages from investing in the region. The region may capitalize on demonstrating its successes with a modern high-technology solution to pressing regional problems, receiving recognition nationally or even worldwide. Others, elsewhere, are in the same boat and can benefit from the lessons learned and practices employed.

People have expressed a fresh spirit of need for less-public and more-private involvement in life. Often expressed as reduced public agency employment and reduced funds for established

agencies, the perceived spirit can have profound effects on the land and on its users and managers, especially as public land use increases while funds for protection and management decrease. There is no singular solution, but the full program of Ranging can provide major assistance.

Committed to using research results from past public investments, Rural System is also committed to rapid increases in studies for namable gains. Though the U.S. has an international reputation for scientific research, the National Science Foundation reports that citizens of the U.S. have turned against supporting research. Drastic cuts and reorganizations have occurred. Many areas of research in universities have been cut and costs have increased. Rural System seeks new ways to continue to produce research results, to maintain momentum for needed solutions (Chapters 5 and 6).

It has been difficult to sustain necessarily long-term studies of slow-moving natural systems. The needs for ecological knowledge, for understanding biodiversity and its proper care, for reducing wild fauna damage, for protecting rare species, for assuring human enjoyment without losses to the wilds... are all very real, and we have worked with graduate students prepared to learn new approaches to meeting them. Rural System can make use of the past progress of faculty and students of Virginia Tech, and other colleges and universities. The union of three—the region, Rural System, and the universities—in a unique effort, can bring new benefits to citizens at low tax costs, and can move new research findings from on-the-shelf to in-practice. Ranging will be central for rural area research and productive studies, attracting a large number of visitors hoping to experience recreational novelty, action, invention, and the vigor of a revitalized area and its people.

Stoneworms

I walked stretches of the Appalachian Trail in Maine, Virginia, and Georgia (in Ranger training), and did trail work with a team of five near Oakridge, Oregon, Mule Mountain lookout access, in 1965.

I worked with a small trail crew, opening an old trail with many cross-trail large logs. On that trail, I was surprised to slide downward, met my Pulaski tool along the way, gashed my thumb, and was pleased to walk with the stock back to trucks and surgery the next day, living “happily ever after,” well-cautioned about sliding soil, tools “with a mind of their own,” and a new respect for the potential dangers and return-to-base costs and losses of the Western USA national forest.

Years later, I collected and studied books on trail-building. On Rural System lands I proposed intensive, modern trail building based on US Forest Service and National Park trail analyses, and active use by the procedures developed.

We plan to create extensive trail systems, well-marked and with electronic markers for users during the day and at night. We’ll create several trail types, such as total ownership access, views, wild-plant sites, and Crescent management access and demonstrations. We plan diverse trail types, well-constructed to avoid erosion, and easily maintained (smoothed, shaped, and with water bars).

Stoneworms is the proposed trail-building and maintenance Group within Rural System. It will study and develop trails, perfecting its own work. It will also be a demonstration and educational Group. It will get trail work done in demonstrations, tests, and contests. Stoneworms will enhance the potentials of forestry, fire crews, recreation, research, game harvests, and

fishery enterprises. Trails convert land into resources, and thus to potential benefits through the well-known economic concept of *access*.

Many miles of trails are needed, as are returns to cover costs. It would be unfair (and ineffective) to require Stoneworms to bear the full burden of a positive income-to-cost of operation. Trails provide a form of insurance against fire losses. They reduce forestry costs, challenge soil terrace creation and roles, and provide inspection access and security aids. They add beauty and increase property value.

Guides are needed in Stoneworms for guests of many types. Carefully selected, the Guides will wear noteworthy clothing, provide commentary and instructions, sell products as available (trail-building, hiking, camping, nature appreciation, exercise, safety and first-aid, woodland survival, etc.), and help bring urban visitors and trail users into harmony with their new rural surrounds. Trail Guides will gain tips as well as salaries, and engage each other in perfecting outdoor skills and knowledge of Rural System areas and waters for many types of visitors (some international, some with special needs).

Safety and Security

Safety and Security, the Rural System Group with the longer-than-usual name, has a large task on each ownership or cluster in communicating—to staff and guests—rural, outdoor, hiking, camping, and boating safety, along with occupational safety within composite fields known for unsafe, accident-prone conditions.

We plan to work toward international prominence in safety as we encounter a full range of often-unsafe conditions, and staff with prior education in safety (on which we plan to capitalize). As we work to gain new profits, we shall reduce costs and losses from accidents and lack of knowledge of danger and hidden personal costs.

We emphasize (minimally) hunting and angling and outdoor-life safety categories. Human/wild fauna relations are part of an on-site message as we encounter diseases, poisons, allergies, and typical camping-related accidents and temperature stress-conditions. We intend to implement a system of wild fauna law violation, prevention, and apprehension procedures.²

Safety in fearfulness, and information on unsafe expected behaviors of guests, will be gained as we come to understand international tensions and real threats to life within the regions with which we work. We anticipate fires, theft, and food destruction by many means, as well as water and food disease involvements. We'll employ ecosystem risk analyses (within VNodal), as suggested by Swartzman and Kaluzny.³ We discuss direct links among our safety and security costs, time and health losses, and reduced life expectancy—displayed in our computer-produced indices to group successes (system branding as “healthy” for guests, employees, and affiliates).

We seek additional advice and tactics on protecting markets, crops, water supplies, and livestock. We respect cleanliness and advice for achieving it, especially in disease deterrence/avoidance. We welcome advice for avoiding specific rural threats.

Modern Hunter Safety

There's emerging need for a profitable school for hunters within Rural System, to get new hunters licensed, and experienced ones attuned to needs and responsibilities of hunters on

² Giles RH. 1978. Wildlife management. San Francisco (CA): W.H. Freeman, Co.

³ Swartzman, Kaluzny SP. 1987. Ecological simulation primer. London: Macmillan Publishers.

Rural System lands. The school will teach safety practices to reduce accidents, increase the quality of every hunt, increase hunting success, and reduce negative public attitudes toward hunting. By attending the class, hunters will also gain useful Rural System connections, and pride and local awareness.

The classes will be conducted on 2-5 training areas (progressively developed) on contract land, typically within a natural amphitheater. Participants will receive certificates, Rural System literature, emblems, and equipment access. We shall seek state-parallel approval for adequate hunter knowledge and skills. Some presentations will be shared on a Rural System blog.

The presentations will include:

- Statistics describing hunter safety problems, and therefore why the class is important;
- The typical personal problems of unsafe action or non-action;
- An answer to the question: “whose problem is it?”;
- Demonstration of accidents about to happen, and how to control them—what to do; and
- The benefits of hunting safety.

Emphasis will be on:

- Different equipment, hunts, experiences, and practice—leading to Rural System ranges and courses, personal equipment, and dress;
- Special details for hunting on Rural System lands (and usually others)—what we expect and how participants get a Rural System certificate of having completed the course, as well as a general one;
- Serious students, for maximum behavioral change in time for permits and awards; and
- How participation of hunters in the class helps land owners, Rural System staff, and the people of the area. We shall invest some percent of funds in improved hunter education: places, experts, equipment, publications, training aids, blog posts, and insurance.

Rural System’s *Challenge Course* will allow hunters to practice what they have learned on a few, carefully-selected sites. The annual program will be conducted for state agency administrators to see the latest Rural System developments in the field, the likely changes, and the electronic media being produced.

Rural System may later create a memorial area, a special forest location to commemorate people known to have been killed in hunting-related accidents. We will also track accidents—where and how they occurred—to build a model of relative safety and needed safety actions for Rural System hunters. We will someday make GIS maps of areas known to be safer than others, and areas that are relatively more dangerous. Hunters, biologists, and managers need to know if such areas exist. We know areas exist and can be mapped for where more animals are shot and killed. We have planned, mapped soundscapes (Chapter 2) for law enforcement agents—aids to reference when out-of-season, or in “no-hunting” areas, to detect the presence of poachers.

Every three years we shall invite state hunter safety leaders to a conference near one of our education areas. We shall exchange ideas for improvements and for encouraging solutions to the main problems observed. Also, occasionally, we shall report on our estimates for future hunting production, and our current plans to address it (i.e., harvesting devices, probable species and areas, and hunter sex and age classes).

For example, we believe that hunters’ willingness to hunt (and trap, as our data show) declines with age. We can model that and estimate the future of hunting on Rural System lands due to population demographics. We can simulate effects in changing prices, changing travel

costs, willingness to consume, and willingness to add game trophies to the home décor. This information may then inform marketing actions to stabilize hunting on Rural System lands, and therefore contribute to stable corporate profits.

We believe that Rural System can profit from several books on hunter safety, timed for release in the pre-hunting season. A safety-oriented bibliography and glossary will continuously be built. We shall compare carefully, before and after education effort, to estimate change in behavior for the money/time spent. The Marketing Group can suggest an award for Rural System units on lives saved, reported decline of unsafe practices, and not-crippled-animals.

Flora and Fauna

As elsewhere, this is not the place to quibble over terms, but readers may gain from my past, small efforts with the public and workers for likely significant benefits from discussing wild *fauna*, specifically, and not merging flora and fauna in every not-very-thoughtful use of “*wildlife*.” Enforcement of rules and regulations differ significantly, as do conversation about “biological diversity.” Vague uses now influence agency names and university departments ... *and* decisions about “proper” budgeting, staffing, and major allocations.

Within Rural System, we have management descriptions for deer, bear, ruffed-grouse, foxes, turkey, raccoons, bob-white quail, and other wild fauna, and will implement plans for these on approved, leased lands as soon as feasible. The emphasis here is basic diversification, bringing income stability. The Owls Group (Chapter 10) is a diverse, special Group, but it presents expansion options in field studies, dinners, fireside entertainment ... and trips for people searching for additions to their bird-watching life-lists. The Foxes Group, more-so than other species, will require special attention to human recreational viewing as well as diverse alternative uses in pest control, hunting and trapping, rabies outbreaks, and as predators in ecosystems.

We rarely mention individual plant species to be managed on private ownerships, but we plan active work within Nature Folks, a Group with some focus on species protection and management (e.g., ginseng), and forestry-related efforts with tree species and special sites for groups of tree species (i.e., arboreta and cemetery-trees) and agroforestry, with their linear fruit-producing shrub lanes. We’ll explore insect and terrestrial snail populations and their roles throughout our areas, and surely someday we’ll study the use of insects as food for pets, now eaten by some people.

Deer Herd Management: The Concept and Rural System Plan

Deer are a prized element of the wild fauna throughout the region, and likely in expanding regions of the planned Rural System. We may someday provide a program equivalent to bird life-listing, as we travel around the world to see and learn about deer and add new species to our personal life-lists or tally official “sightings.” Thousands are harvested annually by hunters. In addition to their appeal to sportsmen, deer are beautiful animals with great appeal to many citizens and visitors.

However, they can be harmful to forest regeneration, crops, and occasionally to motorists. Deer herd management is necessary to achieve the right number of deer both for land owners, and general public welfare. Management is essential. Fortunately, more is known about the management of deer than any other wild animal, and major known elements are included in Rural System’s modern general systems approach.

With several related objectives, Rural System will concentrate on lasting, net financial benefits from white-tailed deer populations within managed areas. Some owners of areas will specify more precise objectives, such as tourism; other owners will specify travel economies; and still others will emphasize reduced cropland and tree damage. The quest will become increasingly more difficult as questions are raised about “balancing” landscaping-plant damage from deer, stabilizing motel and hunting-camp attendance, or about changing popular quests for superior antlers vs. numbers of deer to harvest. These questions must take into account changing demographics, as numbers of hunters and license sales decrease, safety concerns increase, populations of people become more urban, hunters with less practice, and as fawn and coyote dynamics create uncertainties.

Our emphasis for the near future is on net human gains from the deer resource, over many areas, and over longer time during the year (while significantly reducing the likely losses from the growing resource). Active Rural System deer management will present deer herd history; work with reducing deer herd damage; relate deer weights to forage requirements; appreciate the importance of cover and energy (“saved” vs. lost); quantify herd increases; conduct deer tours on Rural System lands; implement new hunter success scoring procedures; promote local deer resource clubs; promote related art and photography of deer and their habitats; promote safe deer carcass butchering, roasts, and recipes; and sponsor youth deer track-casting contests, with related “trail findings.” **The Deer Group’s** public element will sponsor roadside deer-crossing signs and electronic signals at major crossings to reduce auto-strikes. (There’s work ahead!)

Setting hunting seasons is a major management act. If hunters or land owners can help set proper seasons, then they will likely observe an improved deer herd on their land as well as surrounding areas. The proper combination considers (1) the opening of the season, (2) the length of the season, (3) the sexes that can be harvested, (4) the cost of the license, (5) the weapons used, (6) the timing throughout, (7) the number and types of permits issued, (8) and a predetermined number of deer that may be taken each year. The predetermined number is a very complicated calculation, done by sophisticated wildlife biologists and typically using a computer. The calculations involved are more than possible to review here.

The main points are to:

1. Encourage detailed processing and reporting, including how well the season achieved the pre-stated objectives;
2. Support The Deer Group’s efforts to obtain regional and state-limited seasons, and other factors designed to achieve calculated harvests; and
3. Encourage studies geared to improve such calculations and to determine means to more closely harvest computed, specific deer... all safely.

There are good reasons why lands are posted against hunting. Nevertheless, in order to achieve the harvests needed (to prevent loss of surplus deer production and damage associated with overpopulation), hunting is needed. Yet, people are leaving rural lands, creating new problems related to land owners, hunting effectiveness, hunting laws and knowledge about them, and deer harvest estimates for the future. The Deer Group provides an alternative to posted lands—a way to post and yet gain the desired harvests.

There are many new ways that people can obtain benefits from deer. Provisions for hunters—like trails, lodges, and other facilities—can enhance the character of the hunt or

observation period. Rural System plans to offer select opportunities and programs for hunters to significantly increase deer hunting experiences and benefits.

Efforts to reduce crippling losses can reduce the displeasures associated with some hunts. Only by allowing certain weapons, providing areas for sighting-in, practicing with weapons before hunting, and using skilled trackers can we reduce such losses. A Rural System **“Trackers and Trails”** program is being developed for outfitters, trail guides, and helpers.

Deer have a peculiar behavior. The average deer stays within about one square mile in its lifetime. It’s possible to have too many in one area, too few close by. Deer are also greatly influenced by their environment. The richness of the soil and the abundance of food influences many deer characteristics. The better the habitat, the greater the diameter of the antler beam, the greater the body-weight, the more kidney fat, and the more tines or points on the antler. Better habitat also leads to greater number of ova produced, a greater chance of does producing twins, and a greater proportion of young in the population. These are indicators of how well a manager has gotten and kept a deer population healthy.

A large, healthy population is hard to achieve. Doing so is a balancing act among select options and conditions:

- If there are many deer, they eat much forage, otherwise available for growing trophy antlers on bucks.
- If many bucks are removed, the available food goes into extra fawn production by the does.
- Young populations are most vigorous in reproducing.
- Old populations have larger antlers and greater sporting quality; they remain reproductive.
- The smaller animals require, relative to the larger ones, more food per pound of body weight (you can feed more pounds of big animals on a limited range than you can small animals—but fewer animals).

Thus, the percent of bucks and does and the ages of young deer are critical since that determines how big they are and thus how much food the population requires. Only very local, long-term, sophisticated analyses, as provided by Rural System’s Deer Group, can achieve this balancing act.

Deer rarely live past eight years. Thus, it’s feasible to remove animals skillfully by hunter harvests. Typically, between 20 and 40% of a population can be harvested each year, and landowners may yet have the same number of deer next year due to natural reproduction. As other animals, deer have maximum density limits. One per 20 acres seems, in a local population, to be about the upper limit. Limited food supplies and overcrowding, or “density stress,” operate to keep this limit. Staff and assistants will make deer “droppings” and track counts, and correlate them with deer numbers and other factors of the environment.

Stocking deer is unlikely to be needed in any of the regions under management. Predator control is unwanted, except for much more stringent control of free-running or unleashed dogs. Spotlighting of deer must be stopped by increasing enforcement activity and increasing effectiveness, projects, and landowner cooperation with state game law enforcement agents. (Limited, announced spotlighting by staff for counts may yield useful data.)

Rural System’s Deer Group can provide a timber-rotation schedule that will attempt to achieve an owner’s desired deer production through balancing many system factors. As trees grow out of the reach of deer and shade the forest floor, available foods decrease. A system of

diverse species rotation is needed so that about the same number of acres of productive capacity is producing needed foods. Deer readily use the mast or nut production in fall and winter (as do competing mammals and birds), but mature forests rarely sustain the year-round production required for a large number of deer. High mast production (energy and nutrients) is planned for superior deer production areas.

Water is rarely limiting for deer though they will use it where it occurs. They can get most of their needs from succulent foods. With climate change, deep-water and flowing-water sources now seem needed for deer and other fauna. Salt is taken in the spring, but does not seem to be a limiting factor for deer. As Olaus Murie said for elk: “a salt block is like a beer fountain might be for a town—much used, but not necessary.”

Deer management can produce abundant, diverse, year-around benefits to urban people with increasing interest in and gains from the wild deer resource. Deer, when abundant, become farm and urban-border pests. Newly available, Internet-based observations will be offered of deer herds—sharing, as never before, all aspects of their environments, lives, and difficulties.

The Quail Group

The Quail Group will focus on managing bob-white quail (*Colinus virginianus*) for profit, and is expected to expand rapidly among rural home-owners, following recent “lows,” with herein-recommended management. Quail, a little bird, needs so much attention in so many ways. People often do only one or two of the management actions listed below, and so experience little success; no one knows exactly what is wrong in every case, and sometimes a diversity of variables are not right for healthy quail populations. We believe that a manager, doing most of the whole list of actions, will be able to maintain viable populations of quail on rural lands.

Quail fly moderate distances, flushed from quiet repose in groups known as “coveys.” Season-specific food management is needed—literally year-around seed and insect production and management of small, ground-level insect abundance and diversity of predators. Large areas are needed year-round for covey escapes, with open trees for flights from diverse potential enemies.

Where a few quail still exist:

1. With Rural System staff and The Quail Group, list the desired benefits for whom, where, over what period, and within what seasons the system objectives will be sought:
 - i. Family pleasure from calls and sightings
 - ii. Family health
 - iii. Harmful insect reduction
 - iv. Hunting sport gains
 - v. Nature photography
 - vi. Bird watcher attraction
 - vii. Photographer attraction
 - viii. Dog kennels, training, trials, shows, contests
 - ix. Partial game preserve unit (natural quail)
 - x. Studies (profit-oriented)
 - xi. Falconry
 - xii. Organization

- xiii. Publications
 - xiv. Consulting base (demonstration of procedures)
 - xv. Equipment and clothing sales
 - xvi. Land visitation permit sales
 - xvii. Predator-related work (Remove hawk-owl perches)
 - xviii. Horses and horse use and trails (sightings, flushes)
2. Keep an account of all costs.
 3. Use crowing posts to record birds seen, locations, and covey density. Place whistle (the “bob white” notes) (5-6’) posts at numbered corners of all 1/3 acre triangles.
 4. Develop triangular hedge rows throughout the area. Use a portable electric fence within select areas. Graze the interior triangles on a 4-6-year rotation.
 5. Vary the hedge vegetation in soft-mast-producing shrubs: privet, viburnum, crataegus, rose, honeysuckle, elderberry, blackberry, raspberry. Make some hedges of conifers. Use low-growing types: mugo pine, Fitzer juniper, or be sure to prune to keep dense low-form for winter cover.
 6. Work for diverse, high insect populations in spring.
 7. Provide water sources, 1/acre, for special periods.
 8. Provide poultry grit, one spot per 2/3 acre.
 9. Provide superior, non-toxic dusting areas, one spot per 2/3 acre.
 10. Mow hunter- and observer-pathways or trails throughout the area.
 11. Develop pyramidal brush piles in the “hedgerows.”
 12. Place old fence and brush in pyramidal form in “waste areas.”
 13. Develop one “snow shelter” (any type) per 1/3 acre (e.g., at the corners of all triangles).
 14. Plant each triangular “quail field” into a different crop and rotate them: millet, corn, ladino clover, fallow, low-cost grain (wheat, oats, barley, etc.)
 15. Fertilize and lime inside each field in strips to avoid an even pattern to increase insects.
 16. Have one of every 6 triangles in fields with high-grass nest-cover. Mow pathways in these areas in spring.
 17. Study regional densities: keep records of sightings, especially cumulative maximum.
 18. Create a permanent census route for trend studies (e.g., modified King method).
 19. Weigh all recovered birds; record weights and watch trends. Try to devise tactics to improve weights.
 20. Observe sex ratios; calculate chi-square to detect when significant differences occur.
 21. Remove key quail predators, especially feral cats, also crows.
 22. Encourage large mammal trapping nearby and within protected areas.
 23. Develop wire-covered standing-grain areas.
 24. Develop emergency feeding “roofed” areas near roads (easy access by jeep, etc.) for severe-winter supplementary feeding.
 25. Develop horse trails (for diverse sightings and secondary benefits).
 26. Develop fire breaks.
 27. Use cool-soil burns in small select areas if hedge rows are not to be used. Rotate burns every 4-6 years.
 28. Avoid pesticide use.

29. Fertilize and lime fruit trees (e.g., cherry) in hedgerows.
30. Develop paths for bird watchers. Develop a guide service to gain benefits from population success.
31. Develop a kennel for visitors' dogs.
32. Develop a stable; use tethered horses for grazing regulation of vegetation in triangles.
33. Reduce groundhogs (*Marmota monax*) that build dens for predators.
34. Build blinds for photographers.
35. Improve soil conditions of all types; eliminate erosion; add organic matter to 'scalds.' Areas that "will not produce anything" will not produce quail; such areas increase the divisor in "Quail/Area." Map and subtract their area.
36. Join or develop a quail-related organization with fees, newsletter, blog, etc.
37. Take quail samples to a veterinarian or lab to get a base-line condition on health and disease. Collect liver, brain, and fat samples annually on harvested birds as baseline in the event of radical change in populations.
38. Put snow fence in sparse hedge rows for wind protection.
39. Conduct spring call-count routes to establish trends and population change/\$ invested.
40. Invite press coverage, share blog contacts and images.
41. Sponsor studies for quail genetics, potential relationships between/among local quail and purchased quail from several sources.
42. Determine the exact spot of each quail kill; the quail can become the "monitoring species" (location and date) for analyses of radio-active nuclide presence, starting with a very-low level late in 2017, rising thereafter with reported reaches toward "nuclear warfare" and test actions within North Korea.

Wild quail populations, easily lost from the convergence of many land use factors, can probably be regained, and major, diverse benefits, such as the "bob-white call," can be cost-effectively gained for many people... or lost.

The Wild Turkey Group

Like Rural System's Deer Group, **The Wild Turkey Group** provides a departure from past wild faunal management. A symbol of regional Thanksgiving, the turkey feast is well-known, perhaps a part of Pilgrim life in Virginia. The wild turkey is a link to state and federal funding within wild animal management. It is sensitive to and harmed by land use changes toward urban conditions.

The popular wild turkey (*Meleagris gallopavo silvestris*) has been restored in Virginia and elsewhere; Dr. Henry Mosby was highly influential in accomplishing this. The "turkey" is one name, but that word names two distinctly different birds requiring different conditions, thus two types of active management: **poults** and **adults**. They require attention for different periods in different faunal space. They require many environments, including grass/forbs, edge/shrub, and mature forest of at least two different ages each ... thus 24 separate considerations and action programs. "Managing for turkeys" is said to be for all species; if their 24 conditions are met, many needs of many other species are likely met too.

The turkey requires forests, but its young also require cleared areas (primarily for nesting at edges, and for insect foraging). How forests are managed influences turkeys and the complex resource system grown up around the bird. Scientists have intensely studied how to manage

turkeys. Optimum forest management for the turkey may not result in maximum financial returns from the forest. The difference—the net losses and potential gains—are of great interest.

The Wild Turkey Group represents a major, alternative natural resource strategy. It is similar to that proposed for The Deer Group and other faunal enterprises of Rural System. It will account for the unique nature of animals, denying that all animals are 'wildlife' subject to the same over-generalizations. It demands *applied*, superior managerial skills and knowledge. Perhaps more than any other game animal, managerial efforts to increase turkey populations benefit many other game animals, and tend to hold or increase biodiversity. These can only be tallied as secondary gains, largely unaccountable from the singular indexed task of *lasting regular profits*.

From one perspective, the Wild Turkey Group is a large, agribusiness management firm. It will manage land for profits related to the “crop” —all marketable entities associated with the turkey. The Wild Turkey Group will be developed cautiously, but rapidly to achieve a diverse, sustainable enterprise that brings clientele to the wildlands, assures stable use in the hunting season as well as other times, and operates to assist other landowners in achieving positive gains from their turkey resource. The approach and actions are:

- A systems approach to single-species management of wild turkey for maximum benefits over time;
- Forest and wildland taxation advice for owners, and perhaps access to a foundation or relating to an educational and research group that provides tax incentives for progressive investment in turkeys;
- Improved forest land value assessment for long-term valuation, and land and water banking;
- Publications and other media related to the wild turkey;
- Fees for full-service turkey hunting on Rural System lands;
- Special shows, workshops, social media, and educational events on topics related to wild turkey management;
- Special advertising of Rural System wild turkey work to assure maximum public relations benefits from investments in the resource;
- Ornithology tours for people to add the wild turkey to their life list;
- Several major hunting lodges;
- Prescribed burning and wild fire management services;
- Detailed turkey management plans for each area; and
- Rented blinds for turkey flock observation by tourists and bird watchers.

The Wild Turkey Group’s novel contribution is its scale, diversity, resource value enhancement, and monetary emphasis. Turkeys are a function of the land but also of humans. The turkey population is a resource; the manager usually seeks to maximize total net benefits from all of the uses of the population. General objectives of a biological nature are to maximize poult production, increase forage, provide adequate water, and sustain a viable breeding population.

The wild turkey is the largest game bird in the United States and probably the most difficult of all to bag. “Gobblers” (males) may attain a length of 48 inches and a weight of 16-18 pounds, whereas hens rarely exceed 36 inches in length and 10 pounds in weight. Weights in excess of 30 pounds have been reported, but birds larger than 20-21 pounds are a rarity. A gobbler can usually be distinguished from a hen by a tuft of coarse feathers on its breast, called a

“beard,” and an upwardly curved spur on the inside lower part of each leg. Hens occasionally have beards and in some instances beards do not develop on gobblers, but these cases are rare.

Turkeys are polygamous breeders, with one gobbler mating with several hens during the mating season. The male comes of breeding age at two years, while females take only one year. The male attempts to attract as many hens as possible by making gobbling sounds during the mating season, which usually begins in late February or early March, depending on the severity of the weather. The hen lays from 8 to 15 eggs in a well-hidden nest on the ground. Incubation of the eggs takes 28 days. Turkeys have only one brood per year, but following unsuccessful attempts they will continue nesting attempts until success is achieved.

The preferred habitat for turkeys is an all-aged woodland of mixed hardwoods and pines. Although oaks are of primary importance for turkeys, a variety of hardwood species is desirable in case of acorn failure. Turkeys need openings in the forest for insects and plant seeds, both of which are important in their diet. Turkeys drink water daily, so abundant free water, well-distributed over the range, is a desirable resource for birds. Since turkeys depend on their eyesight for protection and escape, woodland cover should be fairly open. Turkeys roost in trees, usually the tallest ones.

Turkeys eat a wide variety of food, depending upon the season of the year and what is available. The diet of adult wild turkeys is comprised of about 85% plant matter and 15% insect matter. This percentage is reversed for poults under six weeks of age. Although young turkeys eat a great variety of insects, grasshoppers, crickets, and cicadas probably comprise the bulk of their diet. Choice fall and winter foods for adult turkeys include acorns, chinquapins, beechnuts, dogwood berries, wild grapes, chufas, corn, barley, clover oats, rye, and winter wheat. Some favorite spring and summer foods are huckleberries, blackberries, mulberries, browntop millet, cowpeas, peanuts, grain sorgums, soybeans, bahia grass, yellow-eyed grass, carpet grass, and insects. Salamanders, toads, and small snakes and frogs are probably under-reported as a turkey food source.

Management for wild turkeys can be quite complicated due to their variable productivity rates and extensive habitat requirements. However, a few things that can be done to ensure suitable turkey populations: (1) produce more food in wooded and open areas, (2) provide suitable drinking water throughout the range, (3) maintain favorable cover and roosting areas, (4) protect turkeys from the often-significant losses from poaching, and (5) ensure against the spread of specific parasites and disease.

Food production in the forest can be provided by leaving a variety of mast- and fruit-producing trees. For optimum range conditions, at least 25% of the forested area should be mast-producing hardwoods, especially diverse oaks. Oaks at least 6 inches in diameter and over 30 feet high are the most valuable for acorn production. Prescribed burning is also an excellent turkey management tool, as it increases production of native grasses and legumes. Prescribed burning should be done no later than February 15, so that nesting won't be disturbed.

If drinking water becomes critical during droughts, turkeys will leave the range. Therefore, it is essential to have a year-round source of drinking water. Ponds and wells with hydraulic rams are means of assuring a supply of water.

Although the adult wild gobbler is alleged to be the keenest of all game birds, hens and young poults are highly susceptible to poaching. To avoid unlawful trespassing and poaching, posted signs and locked gates on entry roads should be installed.

Turkeys are plagued by a large number of parasites and diseases. This is probably due to their flocking nature, which facilitates rapid spread. The most serious disease affecting turkeys is

blackhead, which often causes 100% mortality in flocks. The following practices are recommended to keep infectious diseases and parasites to a minimum: (1) food patches should be kept small and should be rotated every year, (2) free-ranging domestic turkeys and chickens should be curtailed, (3) fields should not be fertilized with droppings from domestic poultry, and (4) pen-raised wild turkey should not be released.

Within The Wild Turkey Group, we know what to do to increase, maintain, and manage well a large population of wild turkeys. The following list is that of named actions, but they are only meaningful within the proper scale, relations, and, of course, timing and cost-effectiveness:

1. Increased hard-mast production and GPS-located wild grapes, which seem to influence movements during the hunting season.
2. Reduced non-specific insecticide use in surrounding areas.
3. Mowing patterns in grassy areas and clover fields to increase insect accessibility for poults. Poults have difficulty getting to their diverse food-creatures in dense grass, mowing can be very beneficial. It needs to be done in the spring to produce changing, variable habitats for insects for poults, and easy access for them at the edges of each mown swath. Poults need abundant insects supplying the needed oils and proteins to maintain body temperature and grow bones, muscles, and feathers.
4. Increased low-shrub cover for nesting.
5. Maintained patches of grains that remain upright in winter snows.
6. Reduced turkey predators, and especially human poachers.
7. Reduced disturbances of all types (logging, recreation, feral dogs and cats, etc.) during nesting.
8. Maintained, small, dense stands of conifers for thermal cover.
9. Prescribed burning to achieve growth of various desirable forbs and special-function areas (plants, fruits, insects, etc.).
10. Increased farm hedgerow lengths (avoid “hawk alleys” harmful to hens and nestlings).
11. Select forest road and trail sides to produce desired grasses and forbs. Leave similar areas to produce native seeds and organisms, and to achieve other benefits of “day-lighting” forest roads.
12. Where field or forest clearings are developed primarily for turkeys, develop and mow the centers (described above), and manage a complex border of nut and fruit trees, vines, shrubs, conifer wind barriers, and native preferred-seeds.
13. A variety of mast-producing (nuts and seeds) shrubs, vines, and trees in sunlit areas in a plan for food production per unit time, based on prescriptions using transition curves.
14. Operate an effective wild faunal law enforcement program.
15. Carefully study the increasing abundance of the Eastern coyote in the region, and its likely effects on wild turkey nests and adults. (Abnormal, relatively new, predation is highly likely in areas producing abundant populations of the bird, and damage control may be part of the managerial costs.)

Monitoring turkeys is done by a combination of the following (using weighted well-sequenced results):

- Hunter reports of sightings will be made by each participant, with date, location, and statistics on the birds seen and taken. Such reports will be confidential, and only for analyses for modeling. They will likely include number of gobblers heard and number of gobblers “worked,” or called up or followed by staff. Hunters derive great pleasure in

hearing birds gobble and having them respond to calls. While “getting a bird” is the primary goal, being in the woods with active birds keeps the hunter “in the game.” Other variables influencing satisfaction will be recorded, such as interaction with other hunters, the environment, and the presence of trespassers (non-members who have not received education or made pledges about maintaining high-quality hunting).

- Checking station reports of turkey kills, misses, and cripples.
- Making springtime gobbling counts (over regular annual vehicle trips).
- Making spring brood counts (and GIS mapping occurrence) for monitoring gross annual changes in the population.
- Making dropping (feces) counts made along a standard stretch of road.
- Making counts of birds coming to bait stations at a set time in a year.
- Monitoring (with a vacuum device) insect biomass along foraging area transects.

As a comprehensive wild turkey system is planned, the information needed from past and local sources can be considered. Studies, with hypothesis testing—minimum comparisons at least—are needed, even though comparable situations, populations, or conditions are almost impossible to achieve. We shall make changes, measure outcomes (especially those hypothesized, such as fruit production per unit area), and apply feedback. Data will be studied together from all areas and Groups.

The Wild Turkey Group will develop a local history of the bird, but also of the managerial actions that tended to lead to the present managerial knowledge—the Wild Turkey Group will prepare plans for the near future.

The Raccoon Group

One Rural System Group will speak loudly about the potentials and relationships within forests and forestry, and will emphasize linkages active throughout Rural System. The Raccoon Group will involve local, highly synthetic activity, linking ecological transition in all communities and types to the many species commonly known as furbearers. Even if no furs are ever taken or sold, many large, difficult-to-see, top-of-the-food-web animals are very important to the ecology of the area, and will be mastered with benefits throughout the rodent-, predator-, grass-, deer-coyote system (with raccoons). The Raccoon Group is focused on a small, conspicuous system that needs knowledge and management.

Furbearers are animals with great appeal, with hardly-exploited financial potentials, and needing intensive management for diverse measures of success. A rich variety of these animals live in the region: raccoons, beavers, weasels, minks, bobcats, rabbits, and coyotes. Without management, they can compromise other land-use objectives, but with management they can be changed into one or several profitable enterprises. Much research has been done on furbearers, but much, much more is needed. Few people realize the complexity and relations of their ecosystem or benefits context.

The emphasis of a major part of our furbearer work is on the raccoon, *Procyon lotor* (the “washer,” named after seeing it apparently washing its food). The raccoon is one among several species with great appeal and with unexploited financial potentials from lands with trees, if managed as suggested within Rural System. The raccoon’s status as an omnivore presents interesting rabies-specific, parasitological, and nutritional questions, potentially related to understanding human food consumption and health.

Raccoons' main food—invertebrates and amphibians—will be provided naturally in the streams or in shallow marshes and ponds, which will be created or enhanced (Chapter 7). Mast (tree nuts and fruits) are used for fall and winter food, and fruits and berries in the summer. Other fall food will be provided by the shrubs and grasses, planned to be planted. Year-around food supply is the often-forgotten requirement for robust raccoon populations. Raccoons will take advantage of corn in nearby cornfields, when available, potentially stimulating work for the Rural System Pest Force to keep the raccoons' action out of Rural System corn, or managed at a cost-effective local population level.

Extensive research results can be brought to showing a superior, total resource system for one species—a system related not only to furs, but also several types of hunting. Profits within Rural System from a fur enterprise are a primary interest. The strategies include marketing of furs, strategic buying, poultry-loss reduction, improvements in trapper success and humane taking, improved care of the pelts, fur storage, local cutting and trimming, alternative uses of partials, and alternative uses of the entire carcass. Fur markets seem to fluctuate due to style preferences and other phenomena. We propose to work with the fur industry, seek diversified marketing strategies, avoid public confrontations, retain a private-for-profit stance, and demonstrate the potentials of storage to achieve sale when prices are high.

Raccoon Group work will include sophisticated studies (expected to attract visitors and students), furbearer workshops for state and federal biologists, trapper schools, legal conditions, vertebrate pest damage manager schools, and fur-buyer schools. Software development will enhance some work, especially as it shows how ecological communities (that support each furbearer) change over time.

Research needs expand far beyond the biology of the animal alone (the past trend) but on to them as center of a total, profitable enterprise. Agencies have waited for funds, but none (to our knowledge) have stabilized an intensive management system including feedback and future predictions. The prospects are not for recreational trapping (strongly opposed by some), but for a viable, profitable enterprise utilizing one of the natural products of the Rural System leased lands ... in ways no one else has been able to sustain in the past.

Visitors and members may come to the area with the planned objective of seeing and photographing all of the furbearers present (as done with songbird life-list counts). A blog will announce the willing successful people, tell of research accomplishments, share in knowledge of the furbearers, and provide excellent photographs, poems, book suggestions, and natural history information. Close links will be built with **The Nature Folks Group** (Chapter 10).

The financial base of the system will come from schools, memberships, tours, individual guests on the area, volunteer work (in-kind salary equivalents), workshops, publications, photo opportunities (for a fee), art commissions, sale of harvested products (glands, bones, biological instruction kits), and new products and services of **The Pest Force**. Links will be made with the nighttime activities of **The Owls Group**.

Following computer analyses and field work by staff of the Raccoon Group, and indications of cost-effective work on a specific ownership, many procedures will be implemented. If specified by the RRx that either (1) more raccoons are needed, or (2) that greater population abundance stability is needed for the future, then faunal-space changes will be made.

One such space alteration (called imprecisely by others, “habitat manipulation”) planned to be made is the **Raccoon copse**. Staff usually implement these, but recognized, authorized and “permitted” groups or members of The Raccoon Group, when supervised by staff, may be given a role without condition of future privilege. Each copse, on an ownership or cluster, will be

created and maintained to enhance or stabilize local raccoon populations ... and the financial benefits will be derived in multiple, some yet-unseen ways, from them. Following local and regional development, a competitive process may be implemented for copses with the greatest evidence of raccoon activity.

The Raccoon copse will be created within an area about the size of an Alpha Unit (recall, an Alpha Unit is 10m x 10m) with a few trees. They will usually be located at headwater streams (Chapter 7), below or close above forest logging-road stream-crossings, and have high soil moisture year-around (a “seep”).

A copse is not static and undergoes expected transitions that need to be described. The maximum number of copses to be put on an ownership is one per 9 acres. We shall use GIS to determine optimum numbers of raccoons, based on suitable areas toward which we work over many years as we study population activity, market-demand, and claims by local people of pest action and fear of rabies.

As noted, raccoons are omnivorous and opportunistic. A variety of foods serve them well. This explains why they do well in areas with very different food conditions ... and makes the point that dens are more important for raccoons than food. The copse will actively involve 31 managerial considerations:

1. In each select area, Rural System will place 2 raccoon nest boxes high in trees to supplement any den present (more than two present will be wasted). These will be placed no more than 150 feet from wet areas or streams.
2. Given discovered competition and tolerance of the animals, the copses need to be about 1,100 feet apart (1.2 foot-ball-field lengths).
3. We shall retain red maple, elm, red and black oak, butternut, white oak, white ash, sugar maple, and sycamore that have dens or are likely to develop them within 50 years (trees of 23 inches dbh, diameter at breast height). These are among recognized den-trees, generally recommended in forest wild fauna work.
4. In the above tree species, where present, we shall saw off select limbs to get den openings started (callus tissue). We plan to use a large-bit hand-held power drill to start a hole at an angle downward to capture water and begin natural den-formation.
5. Where rock dens do not exist, we shall study whether rocks can be moved cost-effectively to create ground dens, and then act.
6. We shall study present or nearby ground-hog dens, and protect or enhance them for raccoon use. We shall work on a local ground-hog management strategy for dens, along with the tree-den tactic.
7. A copse is a high-intensity feeding area, and the gains are for the animals, but especially for human benefits from experiencing the animals nearby.
8. We shall select, for a copse, an area with soft-mast-producing trees ... making the sites difficult to find because of the pair-requirement. Active field workers will GPS-map sites when they are found.
9. Several hard-mast-producing trees are desirable, perhaps also containing den sites.
10. GIS maps will be made of the sites, and gaps in “coverage” will be sought over time.

11. Raccoon population production is that of crayfish and terrestrial mollusk management. We shall place regularly (often from nearby road patrols) small amounts of human and animal food waste (bones, meat-scrap, stable litter) beside the wet areas to increase crayfish.
12. We shall build trails near each copse to assist deposits, but also for protecting watersheds, caretaking, and for guided guest trips.
13. We shall provide a small blind at each copse for photographers and guests.
14. We shall try to maintain a sign at each copse, one that names and specifies Rural System publications and opportunities.
15. We shall select a few small trees and tightly wire them for increased hard-mast production.
16. We shall manage wild grapes. Grape vines will be fertilized, attached, and pruned and lighted (by cutting a dominant shading tree or tree top); new vines may be transplanted in areas where grapes now grow, and may be protected from deer by a wire “tube.”
17. We shall post local raccoon hunting seasons.
18. We shall plant a garden plot of 5 hybrid blueberry shrubs within or near a copse.
19. Depending on the site, and especially if one or more apple trees are present (as in or near an old home-site), we shall plant and protect an apple tree pair.
20. These copses will be high-intensity food and reproduction-related sites, with a partial goal of high quality and quantity food at low maintenance cost.
21. After 3 years of implementing such sites, we shall study raccoon parasites and diseases and relations studies, and shall make changes in the program or design if needed to avoid now-unknown problems.
22. In the headwaters stream, or at the wet area edge, we shall place two 50-pound limestone rocks. The high-probability change in pH of the soil and slow-moving water will greatly diversify the often-unnamed biota of the copse, and will enhance the crayfish population.
23. In our copse, we shall respond, ownership-wide, to meeting a poorly-known raccoon population problem. Even with dens and diverse food, they must have abundant high-energy food in late summer and early fall to allow them to go into the winter in a healthy condition and for the females to bring off numerous, healthy kits in spring.
24. We shall meet one such protein need for raccoons by our managed population of woodland mice and shrews at one or more spots within each copse. (Typically, from a capped hay bale with nest litter placed on dry land and with protected runways, grain added, and wire protection from avian predators.) We shall often place a snag with the mouse-unit.
25. We shall engage bikers with help in surveillance of raccoons (their GPS locations), and from some we shall seek volunteers for copse-building and repairs.
26. Where feasible within the copse, we shall create a soil depression which holds water seasonally (a vernal pool) and that will enhance invertebrate conditions and provide special places for amphibian reproduction for other raccoon food.

27. We shall continue analyzing conflicts in using copse dens, those between opossum and raccoons. Tentatively, we hold that opossum needs are less specific, they are more opportunistic, their needs likely to be more abundantly met, and do not require the moist conditions reported for the raccoons. Furthermore, opossum fur values and recreational user values are lower than for the raccoon.
28. We shall block the likely view from the nearby road of the central raccoon feeding area of each copse. It will be blocked by foliage, rocks, or topography to prevent direct shots by road hunters/poachers.
29. We shall protect the copse and its animals from:
 - ground fires (that destroy logs, den entrances, and some food supplies)
 - grazing (that removes fruiting shrubs, acorns, and grapes)
 - disturbance from free ranging dogs
 - polluted waters
 - poachers and vandalism
 - excessive disturbance by hunters
30. Muddy water creates a nearly sterile condition and produces little food for raccoons. If food appears to be a limiting factor, corn can be planted in patches (protected from deer) near a watercourse, where animals naturally feed.
31. We shall also work to protect the copse from black bear destruction and food use, but most importantly we shall work for tight deer harvest regulations, because excessive deer remove much spring-time foods that underpin the new annual raccoon population.

Raccoon stocking will not take place on the area, since such programs are usually expensive and ineffective. Den boxes will be added to well-spaced, low-value den trees. Headwaters improvements and stabilization, and population protection will generally produce the desired results at low cost. Harvest and hunter control measures may be necessary, however, not only to prevent eliminating the animal in localized areas, but allowing for a natural increase in population.

Hunting dog contests and certifications, as well as new products and services of The Pest Force, may become available. Links with owners of raccoon-hunting dogs will be sought. Hunting and dog-training restrictions will be strictly enforced. Continual harassment by hunters and dogs will eventually result in the loss of part or all of the population through migration or death. The importance of den trees will be impressed upon hunters, and their destruction (e.g., for taking a treed raccoon) shall be strictly prohibited.

A membership organization will be created and managed related to maintaining high raccoon populations, great resource benefits to members and lasting, balanced human, raccoon, and regional resource benefits.

About the Author

While many Americans are presently astonished at conditions in rural America, Robert Giles, Jr., Ph.D., has been working tirelessly for decades on planning solutions to interconnected rural problems. Dr. Giles is a Professor Emeritus of Wildlife Management at Virginia Tech where he taught for 30 years. His Bachelor of Science degree in Biology and Master of Science degree in Wildlife Management are from Virginia Tech. His Ph.D. in Zoology is from The Ohio State University.

Dr. Giles was born on May 25, 1933 in Lynchburg, Virginia. He attended E.C. Glass High School, during which he was awarded a Bausch and Lomb Science award for studies of the ring-necked pheasant. As an Eagle Scout, he was awarded the W.T. Hornaday National Award for Distinguished Service to Conservation and the James E. West Scouting Conservation Scholarship. During his undergraduate years at Virginia Tech, Dr. Giles was an editor for several magazines and the president of the V.P.I. Corps of Cadets of 6,000 students. He was also a member of seven national honorary societies.

During his time as a Professor in the Department of Fisheries and Wildlife at Virginia Tech, Dr. Giles was known for his innovative applications of computer programming and Geographic Information Systems (GIS) to land management questions well before such skills became standard practice within the field (and before GIS was a term). With the support of the Tennessee Valley Authority (TVA), he created the woodland resource management system of TVA, once used on 300 farms a year. With staff and students, he created the first wildlife information base (BOVA – Biota of Virginia database). As chairman of a local planning commission, consultant to the National Wildlife Refuge System, aid to the State Cooperation Commission, consultant for Wintergreen and several realtors, and as a landowner himself, he has developed a unique and alternative perspective on land and its management. He wrote the first plan for wildlife other-than-game for Virginia.

Dr. Giles began working on the Rural System concept in the early 1980s, but did not begin in earnest until his retirement in 1998. When asked about his aims for designing Rural System, he said, “I am now convinced that a superior demonstration of modern comprehensive natural resource management is badly needed and is now possible and most likely within the context of a new corporate rural structure. I do not want to do research. I do want demonstrations of the results of literally millions of dollars of unused research findings. I propose to bring all the power of the computer that I can to realistic and relevant use for parts of the region. This will include using that power already achieved by investments of resource agencies. I propose a system, subject to the law and to reasonable issues of cost, propriety, and community acceptance, that achieves such objectives.”

A colleague of his once said that Dr. Giles can come up with more ideas in an hour than most people can in a lifetime. His creativity is exceeded only by his humanity. Raised in Southwest Virginia, Dr. Giles knows the struggles of people in Central Appalachia, impoverished after the collapse of coal and tobacco industries. He has visited rural areas of Africa (Nigeria, Senegal, Uganda), China and India, and is well-educated in the sufferings of people in poverty worldwide.

Dr. Giles is a systems thinker. He believes that the problems faced by environmentalists and those of interest to humanitarians are interconnected, and that a system of problems must be met with a system of solutions. His career, his values, and his innovative capabilities make him

uniquely suited to tell the story of how a for-profit systems approach can best solve the rural problems of a progressive, capitalist society.

Contact information:

Robert H. Giles, Jr., Ph.D.
509 Fairview Avenue
Blacksburg, Virginia 24060
United States of America

Publisher:

Handshake Media, Incorporated
<http://www.handshakemediainc.com>
contact@handshake20.com