CREATIVELY COMMUNICATING CONSERVATION COMPLEXITY

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Abstract: Designing agroforestry practices to achieve multiple objectives can be a challenging task; often requiring resource professionals to scour numerous and diverse resources for scientific-based design information. To simplify this task, the recently released publication *Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways* synthesizes over 1400 research articles into easy-to-understand rules-of-thumb for planning and designing buffers and other linear agroforestry practices. Over 80 illustrated guidelines describe specific ways that a vegetative buffer can be applied to protect soil, improve air and water quality, enhance fish and wildlife habitat, produce economic products, provide recreational opportunities or beautify the landscape.

Buffers and other agroforestry practices designed to achieve multiple objectives however, can result in complex conservation systems that can be challenging to communicate with landowners. Visual simulations offer a way to illustrate design alternatives so that landowners can easily understand this complexity. The *CanVis Visual Simulation Kit* provides image-editing software that can be used to create photo-realistic simulations of proposed agroforestry design and management scenarios. The communicative and non-threatening nature of simulations encourages landowners to invest time in the design process and offer feedback on alternatives, encouraging adoption and long-term support for the final action.

Together, *Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways* and *CanVis* can be effectively used to design and communicate complex agroforestry systems that simultaneously satisfy multiple objectives.

Keywords: buffers, corridors, conservation planning, CanVis, design guidelines

INTRODUCTION

"....the overexploitation of one ecosystem service can lead to a disservice, a loss, or a reduction in benefit from another ecosystem service." Covich (2004)

Landscapes that are designed to maximize a single purpose often do so at the detriment of other desired functions. A recent example is landscapes designed to maximize ethanol production which is causing unintended negative impacts including water quality and quantity problems (National Research Council 2008). Intense pressure on our limited land resources requires instead that we design multifunctional landscapes as a prerequisite for sustainable land use (Brandt and Vejre 2004). Agroforestry offers a way to create diversified, multipurpose plantings that can support many landowner and societal objectives. Designing agroforestry practices and

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systems to achieve multiple objectives however, can be a challenging task. Resource professionals can feel overwhelmed trying to be experts in many disciplines and then ill-prepared to communicate complex design alternatives that achieve multifunctionality. Two products from the USDA National Agroforestry Center (NAC) can assist resource professionals with designing and communicating comprehensive agroforestry systems.

Science-based Guidelines for Designing Multifunctional Buffers

Many agroforestry practices are buffers or linear strips of vegetation placed in the landscape to provide a variety of ecological, economic, and social benefits to society. They are called by many names, including wildlife corridors, greenways, windbreaks, and filter strips to name just a few.

A large body of scientific knowledge exists that describe the ecological functions that buffers perform and variables that influence how well they provide the desired benefits. Unfortunately, this information is widely dispersed and is not easily accessible nor is it written to provide specific recommendations for design and management. Further, information for some functions is conflicting, inconclusive or as yet nonexistent. In addition, resource management guides developed from this information generally focus on only one resource concern; encouraging single-issue solutions and potentially leading to missed opportunities and overlooked negative impacts on other resources.

To address these problems, over 1400 research articles were analyzed, evaluated, synthesized and distilled into over 80 easy-to-understand guidelines for planning and designing buffers and other linear agroforestry practices (Fig. 1). The publication *Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways* provides rules-of-thumb for:

- ✓ Improving air and water quality
- ✓ Protecting soil
- ✓ Enhancing fish and wildlife habitat
- ✓ Enhancing economic productivity
- ✓ Providing recreation opportunities
- ✓ Beautifying the landscape

By pulling together all this information, synthesizing the best to-date science into guidelines and compiling them in one easily used tool, this publication will give resource professionals the information they need to consider in the planning and design of conservation buffers. With this comprehensive and field-friendly guide, users can assess the potential benefits and trade-offs a buffer might have on different resource concerns and then design buffers that can better provide multiple objectives while minimizing potential conflicts.

The content is crafted to be understandable by many audiences in order to facilitate communication among natural resource professionals, landowners, and other stakeholders. The guide was peer-reviewed and field-tested by over 100 scientists and resource professionals to

assess its scientific validity and utility. It is now available free to order or download through the website www.bufferguidelines.net which also provides a complete bibliography for each of the guidelines.

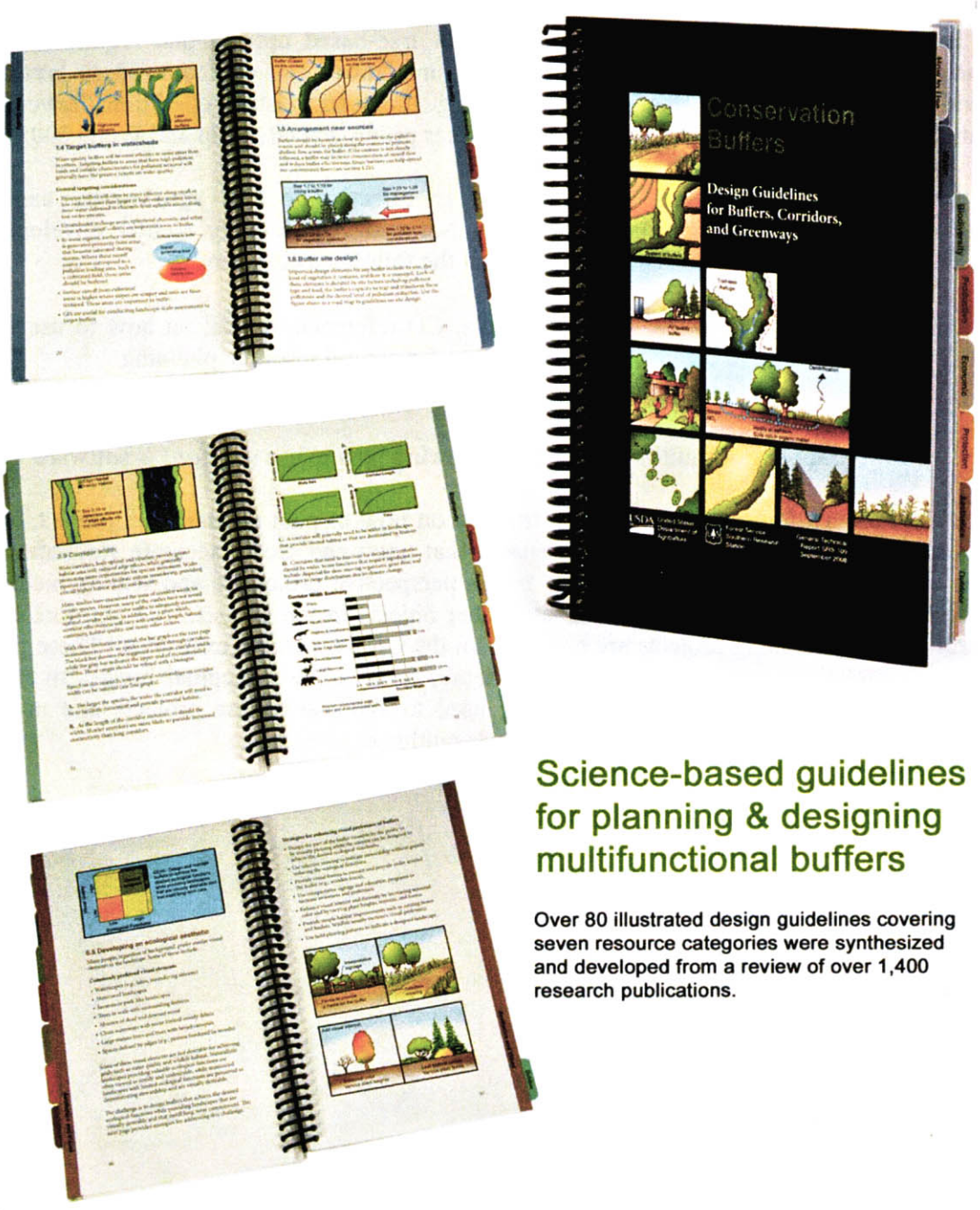

Fig. 1. *Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways*

Visualizing Agroforestry Alternatives

Studies show that willingness of landowners and communities to adopt land stewardship practices is highly complex and surprisingly, many times based on something other than just ecology or economics. Being able to answer the question *"What will it look like?"* seems to be a key in the decision-making process especially for tree-based options that require long-term commitment (Dosskey and Wells 2000). Visual simulations can overcome these barriers by providing a modified image that portrays a change from an existing condition; however this technology is not widely used in the natural resources profession (Bentrup and Wells 2005).

To promote the use of visual simulations as an effective tool in agroforestry and other conservation planning and design, the USDA National Agroforestry Center developed the *CanVis Visual Simulation Kit*. The *Kit* consists of the following elements:

- *Visual Simulation Guide* – a multi-media, CD-reference manual on how to use image-editing software to create visual simulations for natural resource planning
- *CanVis* – an image-editing software for creating realistic simulations with minimal computer skills
- *CanVis Training* – multi-media lessons showing how to use the *CanVis* software

The *Visual Simulation Guide* provides instruction on how to plan a simulation project, acquire images, and edit an image (Fig. 2). To ensure that users can create accurate simulations, the guide offers extensive instruction on how to use perspective principles and scaling methods to correctly size and locate plant materials and other objects in the images. Ten agroforestry and natural resource planning projects are provided on the CD as working examples. These projects illustrate simulations with different levels of detail, from quick conceptual images to complex and detailed visual simulations. Videos are used to showcase these projects and users can develop and evaluate their skill by imitating these editing examples.

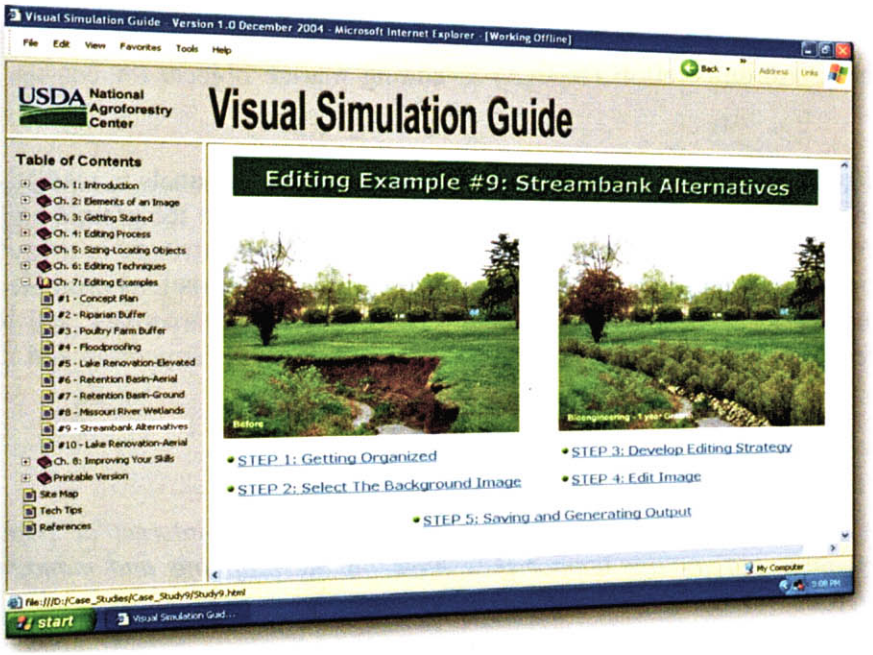

Fig. 2. Case studies are provided in the *Visual Simulation Guide* to serve as examples to emulate.

The *CanVis* program allows natural resource professionals to create realistic simulations with minimal computer skills. One of the main advantages of this program is its collection of existing object libraries that contain images of plant materials, agricultural features, people, wildlife, and park elements that can be quickly added to the base image. There are more than 500 images currently available in the object libraries, saving users' valuable time by not having to create plant images and other objects from scratch.

Fig. 3. The *CanVis* software can be used to create photo-realistic simulations.

Objects from these libraries can be inserted into an image, placed at the proper location, and resized to reflect the correct height. Users can also populate the libraries with their own, customized objects. For instance, the Mississippi Forest Service is populating their plant libraries with species to better reflect their region and recommendations while National Oceanic

and Atmospheric Administration (NOAA) is adding marine objects for coastal planning and management.

The *CanVis Visual Simulation Kit* enables natural resource professionals to readily show how the science is translated into management practices and alternatives on the ground and helps reduce any socio-economic or language barriers, a particularly valuable attribute in today's diverse and sometimes contentious planning environment (Fig. 4). Visual simulations promote sustainability by communicating ideas clearly, by inviting feedback on the alternatives, and by instilling a sense of shared ownership in the conservation system so that it is supported and maintained for long run.

Summary

"Products of science are best assessed not on their intrinsic interest or popularity in the scientific literature, but on the impact they have on the planning and management of real landscapes" (Hobbs 1997).

Together, *Conservation Buffers: Design Guidelines for Buffers, Corridors, and Greenways* and *CanVis* can hopefully be used to effectively design and communicate complex agroforestry systems that simultaneously satisfy diverse landowner and societal goals.

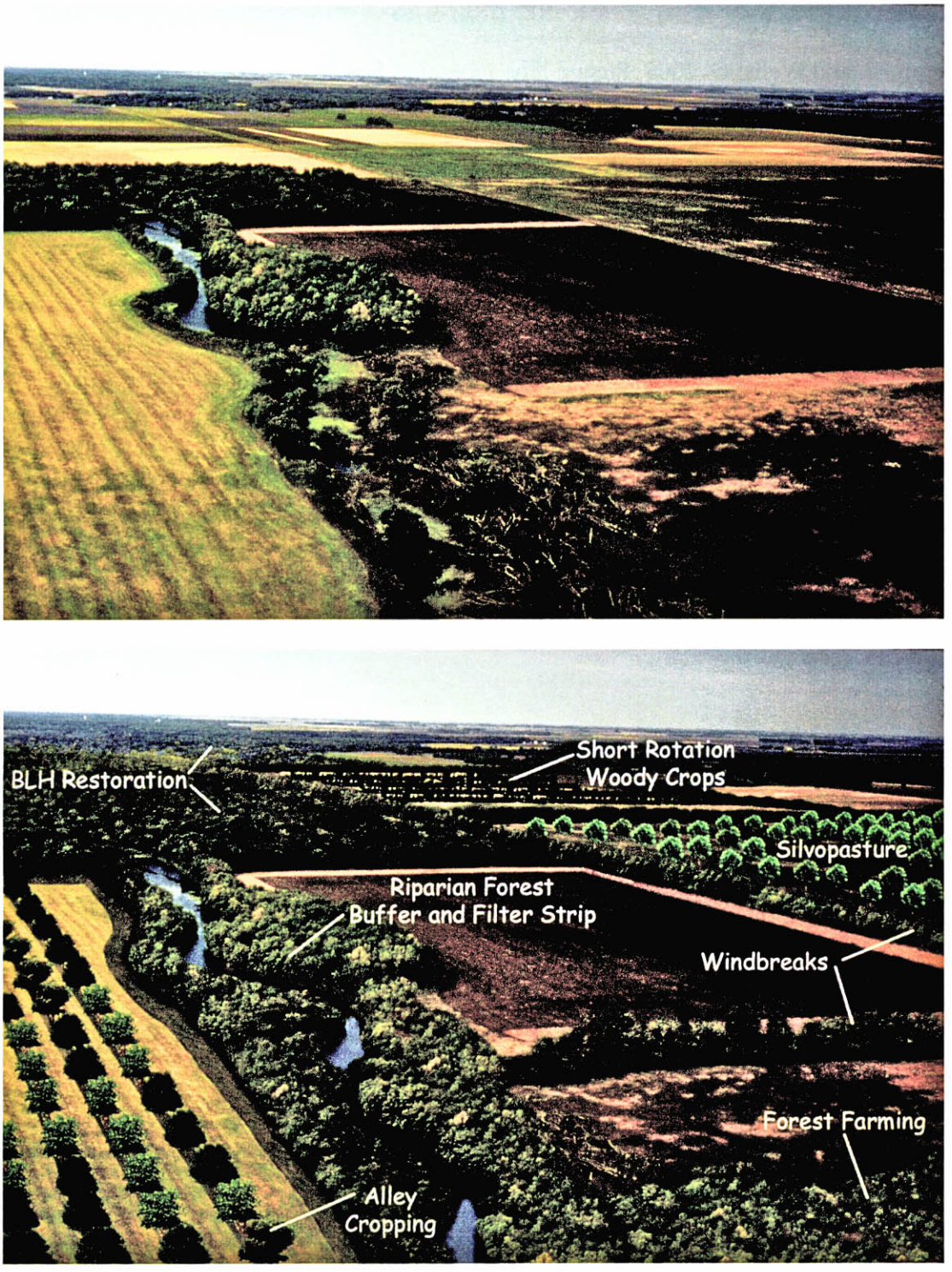

Fig. 4. Visual simulations can communicate complex agroforestry alternatives with landowners, encouraging participation in the design process and ultimately increasing adoption.

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