Riparian/Wetland Project Information Series No. 11
January, 1998

GETTING "BANG FOR YOUR BUCK" ON YOUR NEXT WETLAND PROJECT

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What is the one thing that all consumers expect when they purchase a product? Value! In consumer terms, value is often referred to as "Bang for the Buck". One way to get this is by purchasing the most "function", and quality one can for the lowest price. As with any other major purchase, when designing a constructed or created wetland, whether it be for improving water quality, stormwater retention, or wildlife habitat, one should demand the most value for their investment.

What is the difference between wetland functions and values? Functions are those processes or qualities that are inherent in a given wetland system, and may include: wildlife habitat, nutrient sinks or sources, biogeochemical cycles, aquifer recharge or discharge, etc. Values, while derived from functions, are those qualities or process which society perceives as being important or valuable. For example, one function of a given wetland may be to intercept and store stormwater runoff, discharging it slowly over time into a given stream thus reducing peak flows and maintaining more stable flows during periods of low precipitation (streams are less "flashy"). Society derives value from this function since large peak flows cause the most flood damage to manmade structures.

It is important to remember that wetland functions and values can and do change over time. A wetland that functions as a nutrient sink in the summer may function as a source in the spring. A wetland that provides a critical nesting habitat for an endangered species one year, may not provide that same habitat in following years because of plant community succession or drought. Likewise, due to changing attitudes, increasing population densities, losses of wetlands and open space, etc., a quality that society perceives as being valuable today may be viewed as more or less valuable in the future.

When designing a wetland, people should incorporate as many compatible functions and values as they can into the finished product. Be careful not to go overboard, however. If the design of the wetland is too complex, the actual usefulness and value of the wetland could be diminished.

To achieve a wetland design with function and value, always opt for a multi-disciplinary approach. As a minimum, the design team on any wetland planning project should have a wetland ecologist, hydrologist, engineer, and the landowner.

One of the most important people you can have involved with the design of any wetland project is a wetland ecologist. Wetlands, no matter what functions and values they provide, are all

complex biological systems. To design a wetland without the expertise of someone with extensive biological or ecological training and experience in wetland plants and their propagation, is asking for trouble.

Engineers are also essential. Projects that are designed by engineers alone commonly do not take into account the biological system requirements. After the system is constructed, the engineers then consult a biologist to find out what types of plants would work in the system they designed. This rarely works out very well and the objectives of the system will not be met. Engineers are very good at what they do, but very few have much biological or ecological expertise.

Another critical person to have involved from the beginning is a hydrologist. As one might guess, the wet in wetland refers to water, so it makes good sense to have a person on the team whose expertise is with water dynamics, such as flow, drainage, sedimentation patterns, etc. and can help determine the total water budget for the project.

A landscape architect can add a lot to the value of the project. Their expertise is in blending cultural, biological, and engineering designs aesthetically into the surrounding landscape. By making the project pleasing to the eye, it will be much more valuable to the community.

The landowner is perhaps the most important member of the team. They must have a feeling of ownership in the project and that their concerns are being addressed. Also consider inviting neighboring landowners to participate. This will help in the long run to ensure that the project is a success. In many cases, the landowner and the neighbors will work many extra hours making sure that the plantings are successful by watering, weeding, watching for vandals, and generally keeping the site clean.

Local school teachers can be consulted to find out how the wetland can be used as an educational tool for the community. All grades and classes can benefit, and not only biology and ecology classes, but physics, chemistry, earth science, geography, math, English/composition (students can write about what they see in the wetland), art (draw what they see), and shop classes (help construct informative signs, benches, walkways, overlooks etc.). Kids also tend to feel an ownership of the site if they are involved. Don't forget, they are an excellent source of labor for the planting of the wetland and they enjoy getting out of the classroom for a day.

Discuss your project with public officials and other community leaders. Be pro-active, get them involved from the onset. Discuss with them what you are doing and how it can benefit the community. A CWS, if properly designed, is a community asset that everyone can rally behind and be proud of.

A word of caution: when working with a diverse group, it is extremely easy to get off track and waste a lot of time arguing about insignificant topics. People eventually lose interest and the whole project dies. It is extremely important to stay on task at the meetings and to set time limits. A good facilitator (whether it is someone from outside the project or one of the members) can improve the chances of success of any project.

Once you have decided to develop a wetland project and have formed your planning team, get together for a brainstorming session. Produce a list of possible functions and values that you would like to see. Don't worry about whether these functions are compatible at this stage, it's only a brainstorming session. Once you have formed this wish list, take a look at the biotic and abiotic factors that exist or affect your project. What is the quality and quantity of water, what is its chemistry, what seasons will you have water and how much, will there be effluent discharged from the wetland into another body of water or will it be kept on site, how much land do you have for the project, do you have any political or legal constraints as to the location or function of the wetland?

Now produce a list of compatible functions and values that can be managed together without causing too many problems. For example, there is a wetland in Wisconsin that was managed for waterfowl and as a warm water fishery. Most of the time, the fisherman and the duck hunters got along. The fish grew and the wetland complex began to produce some nice sized bluegills. As part of the management for waterfowl, the wetland was drained to oxidize the tied up nutrients in order to increase the primary production of the system. Since this system was fairly shallow with no deep water refuge for the fish, the fishery was decimated each time it was drained. This created animosity between the duck hunters and the fisherman. As this system was designed, the fishery value was not well thought out. There was no way to keep everyone happy in this case with the given system design. Better planning in the beginning might have prevented this problem.

If your design team runs into problems like the one just described, think of ways to keep both functions working. For example, if a deep water refuge had been built into the Wisconsin wetland, the fish would have been able to use it during drawdown. Bigger fish could have survived and the value for both the fisherman and hunter would have been maintained. If that "deep water refuge" can not be provided for, consider developing the system for only one function. Each situation is unique. Try to calculate the value return for each function and change the design accordingly.

When it comes to budgeting for CWS projects, there is a tendency to spend all the money on the engineering components and then make do when it comes to purchasing or obtaining plant materials. It's hard to put together a biological system when you ignore the biological component. If you are on a tight budget, there are many creative ways of obtaining plant materials (see the Interagency Riparian/Wetland Plant Development Project newsletter *View from a Wetland*, No. 1 and 2). However, don't lose sight of the fact that the plants are critical in getting your wetland system functioning.

Many people feel that planting a constructed wetland is not necessary. If the system is left alone, the plants will eventually colonize it. This is true, but what type of vegetation will come in? Will it be a monotypic stand of cattails? How long will it take to get your desired community? What about the potential for weed invasion (purple loosestrife, foxtail barley, etc.). If the entire team is willing to accept these problems, planting may not be necessary. However, by planting a diverse community composed of the species you want, you can accelerate the development of a functioning ecosystem.

To get a better idea of what the vegetative community should be, visit healthy wetland communities in your area which have similar hydrological patterns and chemistry. Make some notes on species present in these wetlands as well as where they are growing. How deep is the water? What are the associated species? The information you gather on these trips can prove very valuable when planning the species composition for the project wetland. The information will also give you ideas about what water depths each species will tolerate (see **Wetland Planting Tips**, *View from a Wetland*, No. 1).

Before you begin planting, run water through the wetland. Control of the water coming in as well as the water going out is essential. With water control, four things can be accomplished. First, it is much easier to successfully establish the plants. Second, planting with a large crew is easier when the substrate is saturated and has standing water. Third, weed control will be much more efficient. Fourth, manipulating the plant community will be much easier.

Establishment of young wetland plants in a constructed wetland is often difficult because of too much water. This is because the young wetland plants have not developed the aerenchymous material in the stems that allows them to survive in anaerobic conditions associated with waterlogged soils. During the establishment year, water depths must be slowly increased as the plants continue to grow.

Plants are much easier to plant if the site is flooded with a couple of inches of water for several days prior to planting and during planting. Generally, the planter can scoop a hole out with his hand and stick the plug into the resulting hole. This eliminates having to use shovels, augers, tree planters, etc. In addition, when water is actually being brought into the wetland site, you are sure that the system actually works before the plants are planted. This saves time, effort, expense, and, of course, the plants.

Weedy species that often invade wet sites can be a real problem when trying to establish a plant community. By having control of the water both coming in and going out of the wetland site, many of these weedy species can be controlled just by using the water level and length of time the water is in the system.

Once planting is completed, use the hydrological design (worked out before hand between the members of the interdisciplinary team) to manipulate the community in the direction you want it to go, working with natural processes in a pro-active mode rather than an attempt at crisis management. The hydrology of the site will be the main driving force behind the plant community that establishes in the constructed wetland site. By manipulating the water levels and duration, different wetland plant communities will spread or decrease in size. Research has indicated that the main controlling factor will move the vegetative community one way or another is a fluctuating water table. Keeping the water at one level throughout the growing season will decrease the spread of the plants and reduce their vigor.

With some basic information, a little knowledge of plants, and the help of a team with a variety of backgrounds, a wetland project can be extremely successful. Remember that maintenance of the system will be as important as the care that was taken in the construction and planting.

If you would like further Information Series technical papers or Technical Notes, write or call:

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The Interagency Riparian/Wetland Plant Development Project is sponsored and funded by: USDA Natural Resources Conservation Service (Idaho & Utah), USDI Bureau of Land Management, USDI Bureau of Reclamation, US Fish and Wildlife Service, US Forest Service, Idaho Fish and Game, Idaho Dept. of Transportation, and Idaho Power Co.