



The Value of Water

Recognizing
and Using
The Full Potential
of Your
Water Supply

THE NATIONAL WATER RESEARCH INSTITUTE

Foreword

If water is recognized as *the* vital element in sustaining life, why then is it among the most undervalued resources in the world? Generally, people do not realize that water is as essential to their nation's economic development as to their personal health. Where would the manufacturing, electronics, and aerospace industries be without water? Water has psychological value, too. People derive measurable pleasure from recreational activities like boating and fishing, and find comfort in knowing that the water they drink is of the highest quality. More often, these values are not taken advantage of by policy-makers who can benefit from public satisfaction and environmental protection.

The concept that this document introduces had its origin in 1992, when the National Water Research Institute (NWRI) began a four-year research program in cooperation with the United States Environmental Protection Agency to determine the fate and transport of pathogens in proximity to pumping wells. Two years later, NWRI recognized the need to assess the *overall value* of groundwater regulations, and asked the question: What is the benefit and value of a regulation?

The ensuing discussions focused on incorporating *valuing* within the traditional cost-benefit analysis. This led to a broader evaluation of the economic and environmental effects that result from changes in water quality, water supply, and applicable technologies. To further expand upon these issues, NWRI sponsored a Groundwater workshop and conference in 1997 that involved participants from a wide variety of interests, including engineers, microbiologists, hydrologists, economists, public health officials, utility managers, and state and federal regulators. The conference posed many questions and clearly identified the real value of water as an important issue.

Stimulated by these origins, this document was created by a team of professionals who spent a week at a writer's workshop focusing on the question: What is the value of water? The real value of water is not necessarily associated with its price or cost, but *what it does to enhance the environment, economy, and quality of life of the general population.*



How to Make Better Investment Decisions for Your Water Resources

You, the decision-maker, are the custodian of your water resource. As the custodian, you bear the responsibility for the sustained use of your water supply. This responsibility requires that you have a broad view of that supply and its benefits so that your decisions are both wise and truly cost-effective.

First, recognize that your water supply is an **asset**. As an asset, water provides **services** that have real **value** to consumers. For example, high quality water is an asset that reduces the risk of waterborne disease infection, enhancing the consumer's lifespan. This health benefit has real value to your customer.

Each time you make a decision concerning an asset, there exists an opportunity to **invest** in this asset. In order to provide high quality water, you can invest in treatment facilities,

a well head protection program, or other activities. These programs serve your community's health, well-being, and development.

Therefore, by investing in your asset, you can provide services that promote the values desired by you and your community.

Water Investment Terms

Assets are all those factors that create a flow of services. Examples include: water treatment plants, buffer zones around reservoirs, or even the confining layer protecting an aquifer.

Services are generated from assets for consumer benefit. They can, for example, produce reliable water sources, assist in flood prevention, promote health improvements, and create or preserve wildlife habitats.

Values are generated when consumers are improved by these services. Wastewater reuse increases water supply reliability, conserves energy, protects the environment, and creates local job opportunities. These services have values to the community. The true value of water includes all values created by all services.

Investments in your water supply assets will turn your decisions into opportunities for promoting value. For example, by investing in a source water protection program for your asset, a high quality water supply, you provide health services, creating value through customer satisfaction.

Assets and Services Have Unrecognized Value

Unrecognized assets are just as important as recognized assets when determining how you can provide services or benefits that your customer finds valuable.

What Are Your Assets?

Take a moment to list the water resources you would label as assets. Did you include reservoirs, pipelines, or treatment plants? These are your easily **recognized assets**. Now, did your list include wetlands, customer goodwill, fishing opportunities, continuously flowing waterways, or properly trained water and wastewater operators? If you did not have these on your lists, that is because these are your **unrecognized assets**.

A reservoir is used to store and release water. Its value and services provided are easily recognizable. Like reservoirs, wetlands store water. Additionally, wetlands can even improve water quality. However, they are generally unrecognized as assets because, often, their services are not

commonly accounted for. Besides maintaining wildlife habitats, wetlands provide services such as nutrient and sediment removal, aesthetic value, and flood protection. Now, take a second look at your list. What other unrecognized assets can you include in your inventory?

What Are Your Services?

Assets provide services. And these services provide **benefits** that either maintain or improve the quality of life for the members of the community you serve. Look again at your list of recognized and unrecognized assets, and list the services that these assets provide. Do these services affect only customer health and satisfaction? Or, only economic and

environmental benefits? Can these assets have more than one service? Or, hidden services?

Just as there are unrecognized assets, there are also **unrecognized services**. Customer goodwill is an unrecognized asset that can lower expenditures. When goodwill is fostered, the complaint rate may fall. Lowering the cost of dealing with complaints is a benefit for both you and the customer. Plus, goodwill has unrecognized service benefits. It provides public trust, and can inspire public willingness to support system improvements or rate changes. Now, reevaluate your list of assets and services. What additional services can these assets provide?

How You Can Value Your Assets

Now that you, the custodian, have determined the full capacity of your assets and the services they provide, how do you value them? And, exactly what is “value”?

By definition, value is what a person is willing to give up in order to obtain something. For most products, such as cereal, you can simply go to the supermarket, where prices are conveniently listed. You can even compare prices with other cereal products

at other groceries to determine the best value. Money is often used as a ruler for measuring value; how much money someone will pay for a product of service is an indicator of its value.

Unfortunately, you cannot use this ruler with everything valuable. A bright, sunny day has value to most people. Value is also measured by the amount of time people are willing to spend traveling to their favorite park or fishing hole. Many of these types of values, which cannot be measured





in monetary terms, come from the services that water resources provide. These are called non-monetized goods and services.

Sometimes we attain value from water assets by doing things that will avoid or prevent future expenditures. Economists call these “avoided costs.” Protecting your source water can act as a barrier against waterborne diseases. This helps your community avoid the costs associated with increased medical bills.

Water also has future value. For example, by protecting the water stored in aquifers, the water can be conserved for future generations. In coastal areas, protection can also stop salt-water intrusion from damaging the future value of the aquifer and provide a “buffer” against periodic droughts.



Recognizing The Real Value of Water

By treating your decisions as **investments in water**, you will build assets that provide services and generate value. And if you invest with all the values of water in mind, you maximize the value of your water assets. But how do you recognize all the values of water so that you will make the right investment?

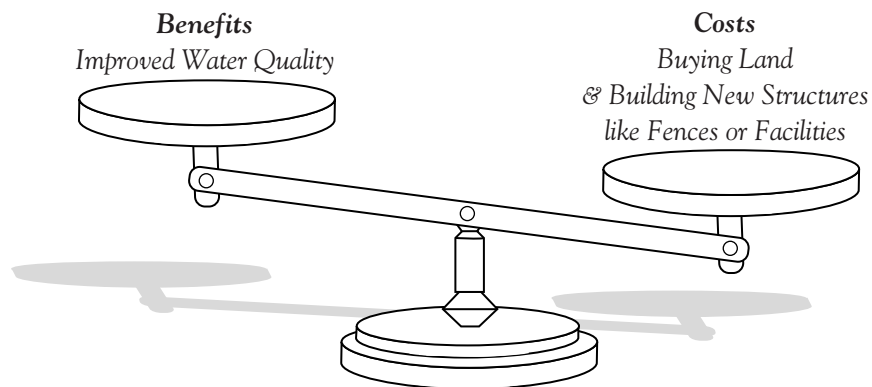
Suppose you are considering investing in a source water protection project. Traditional analysis will show how the balance tips when common benefits and costs are considered.

For example, as the figure below shows, the benefit from a source water protection project is improved water quality. The costs are that of buying the land and building new structures such as fences or facilities. In this instance, the costs outweigh the benefits. As a result, you decide not to continue with the project.



However, there are **unrecognized values** not commonly considered in the benefit-cost comparison. For the source water protection project example, unrecognized values might include reducing erosion, enhancing recreational access, or improving environmental aesthetics. These previously unrecognized values are also benefits that should be considered in the investment decision. By recognizing the **real value** of water, you may tip the balance in favor of the project!

There are several reasons why unrecognized values are not commonly included in investment decisions. Sometimes, the benefits go elsewhere (perhaps to a different agency or a neighboring city); if you are not affected directly, why take the responsibility? Sometimes, the benefits may be realized in the future but the costs affect you now. Or,



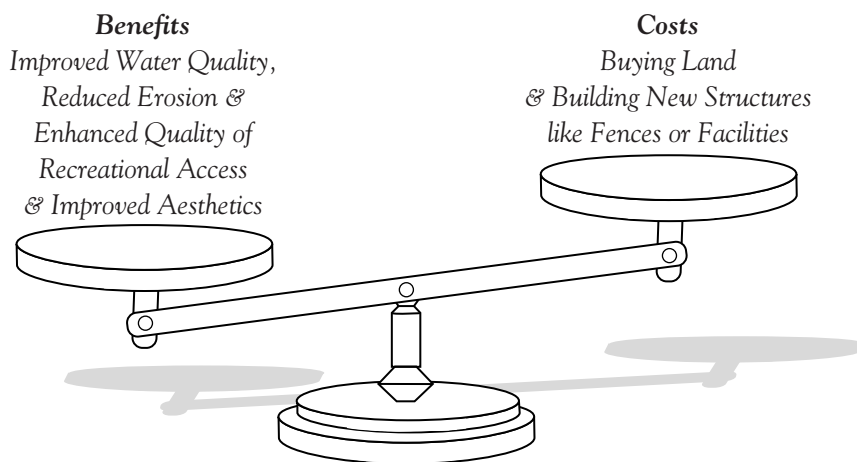
Traditional Analysis



sometimes it is difficult to assign a dollar number to those benefits. For instance, preventing erosion is a service that improves water clarity. It can also deter landslides by promoting greater land stability. Plus, it may reduce your treatment costs.

Because these traditionally unrecognized values are part of the true value of water, they are considered to be **benefits** and *should* be included in your investment decisions. In addition, by including these values in the decision-making process, new partici-

pants — who can share investment costs or provide important political support — may be encouraged to join the project.



Recognizing the Real Value of Water

Making Investment Decisions that Reflect The Real Value of Water

Now that you have had an opportunity to inventory your water supply assets and determine all of the services these assets do — and, can — provide, it is time to focus on how to make decisions that maximize the value of your water resources. This includes examining the value of the services you could obtain from your water supply and making future decisions with these services in mind. Each decision you make affects the value of your water supply as an asset, the services generated, and the value (benefits) enjoyed by the community. Your decisions have the potential to improve or create new services that have value. These values affect your community's health, economy and development both now and in the future.

Sound decision making that maximizes the value of your water involves undertaking only those projects or investment options for which total

benefits exceed total costs. This is a familiar criterion for guiding water supply decisions. However, with some services, it is not always possible for all benefits and costs to be measured in dollar terms (for example, protecting groundwater supplies).

One good example involves the Las Virgenes Municipal Water District (LVMWD) and its Joint Venture partner, Triunfo Sanitation District. When LVMWD wanted to expand its wastewater treatment facilities in Los Angeles County, California, they also needed to accommodate additional sludge disposal needs. There were several ways to dispose of the additional sludge. One way was to continue dewatering and stabilizing the sludge and to dispose of it either by spreading it on a farmland as fertilizer or by unloading it into a landfill. However, in examining alternatives, the sludge was also recognized to have value as compost. A relatively large, nearby market for

good quality compost was identified and the feasibility of this approach was analyzed. A standard benefit-cost analysis revealed that the net benefits of this option were negative: the costs of the composting facility exceeded the value of the composted material by \$100,000 per year.

However, extensive community discussions revealed added benefits or values from composting projects that were not considered in the original analysis. The communities involved supported the project because it met their conservation and recycling objectives. Furthermore, one benefit or value not included in the original analysis was the reduced demand for scarce landfill material that would result from composting the sludge. This added sludge would not go to the landfill; plus, additional yard trimmings would be needed in the composting process, further reducing pressures on the existing landfill. In terms of landfill conservation, this





benefit was not counted originally. A second unrecognized benefit was the prevention of groundwater contamination. To the community, the potential loss of \$100,000/year was more than offset by the conservation value and the protection of groundwater. They also valued the fact that the new facilities would control any odors and utilize methane as a by-product of composting for heating and electricity generation, thereby reducing air pollution. Hence, the value of these “unrecognized” and “non-monetary” benefits is at least \$100,000 annually to the community served. As a result, the reclamation system is now an important element to the community’s waste management and recycling system.

Investment Options and Subsequent Value			
<i>Assets</i>	<i>Services</i>	<i>Value</i>	<i>Investments</i>
High quality source water supply	<ul style="list-style-type: none"> ✦ Improve health to consumers ✦ Improve aesthetic quality 	<ul style="list-style-type: none"> ✦ Reduced medical costs ✦ Less illness, longer life ✦ Customer satisfaction ✦ Less regulatory scrutiny/monitoring costs ✦ Longer infrastructure life span 	<ul style="list-style-type: none"> ✦ Source Water Protection Program ✦ Well-head protection ✦ Treatment facilities
High quality functional wet lands	<ul style="list-style-type: none"> ✦ Nutrient/pollutant removal ✦ Wildlife habitat ✦ Aesthetic value to community ✦ Flood control 	<ul style="list-style-type: none"> ✦ Reduced treatment costs ✦ Greater recreation ✦ More sustainable ecosystem ✦ Greater natural productivity (more waterfowl and fish) ✦ Less property damage 	<ul style="list-style-type: none"> ✦ Multiple uses of supply or use as storage/ treatment facility ✦ Wetlands restoration/ protection
Customer goodwill	<ul style="list-style-type: none"> ✦ Lower complaint rate ✦ Trust ✦ Willingness to support rate changes and system improvements 	<ul style="list-style-type: none"> ✦ More resources available to provide other services ✦ Increased customer confidence ✦ Increased ability to meet future needs 	<ul style="list-style-type: none"> ✦ Public Outreach ✦ Consumer Confidence Report

Three Examples of Possible Investment Options

Many investment options exist. Among them are:

Source Water Protection

If you have a high quality reservoir or aquifer as an asset, you can protect it through a source water protection program. This program can delineate protection areas and inventory potential sources of contamination. It can also implement improved management practices. One of the services provided would be sustaining the quality of customer health by diminishing sources of contamination. As a result, you would prevent medical and other costs associated with waterborne diseases. Plus, by reducing health threats, you will raise customer comfort levels and, in effect, gain their goodwill.



Managing Wetlands

A wetland is an asset that you can invest in through wetland restoration. In addition to removing potential contaminants and enhancing groundwater recharge, one of the services of wetland restoration is increased recreational use. This alone prompts several different values. It can increase recreational sales revenue. Restoration also invites tourism, which increases profit and provides local jobs.

Another commonly unrecognized value is the opportunity to camp, fish, hike, birdwatch, or go boating. However, the personal benefits may appear difficult to measure in market terms.

Regardless, only when all services and values stemming from water supply investments are included will the real value of water be reflected in investment decisions.





Public Outreach and Involvement

Customer trust and support are assets that you can invest in through educating the public about water and your particular water supply. This program could include newsletters, school education programs, open houses and tours, or household hazardous-waste collection days.

A well-designed public outreach program produces better-informed customers who will free your staff to concentrate on water supply issues instead of being occupied with customer complaints. The customers will support and, perhaps, even be willing to invest in your system.

Hence, investments in public outreach and involvement are likely to have considerable value and deserve consideration in water supply decisions.



Nine Steps to Assure This Process Will Work For You

The approach provided here serves as a general guide in developing an action plan that will best serve your investment needs.

1) Acknowledge Assets, Services and Values

The first step in broadening your decision making process is to identify both recognized and unrecognized assets. Ask yourself, “How can my investments in these assets produce newer, better, and more valuable services? And, what values will result?”

2) Reach Out

Most individuals and businesses have economic stakes in the water supply. Find out their perspectives about values and services, and incorporate those ideas into your decisions. You may consider setting up a technical or community-based team that periodically reviews your program. This team can help determine areas of improvement that will broaden the services received from your water supply. Encourage the team to help you express values in both monetary and non-monetary terms.

3) Explore Creative Approaches

There are critical assets that you cannot control. For example, if customers complain that their water looks or smells funny, you obviously have an aesthetics issue. You can alleviate concerns by providing pamphlets on water quality, adding

updates in the consumer’s monthly bill, or inviting those with concerns to participate in a consumer advisory panel. Remember: understanding the importance of every asset is crucial in making investment decisions for your community.

4) Gather Needed Resources

Sometimes, it may appear that there are insufficient resources to complete your project. Rather than discard your project, expand your resources in new ways by seeking contributions, forming partnerships, or gathering community support. Funding may also be available from your state through Environmental Protection Agency programs such as the State Drinking Water Revolving Fund and the Clean Water Revolving Fund, or through other federal agencies.

5) Retain Flexibility

Due to the rapid pace of change, flexibility is important. Team-effort, for instance, requires open-mindedness. Neighboring water districts can agree to join forces to better spread information through a single, encompassing school program rather than produce five different programs. This way, your individual district spends less money but

creates a stronger, more efficient program. Plus, the direct approach to educating schoolchildren will indirectly educate parents.

6) Find Useful Indicators of Success

Achieving your goals will require time and cooperation. One way to ensure the fulfillment of your objectives is by defining and tracking meaningful indicators of success. Receiving positive letters and support from the community is one indicator. Receiving reports of greater fish or wildlife productivity in your ecosystem is another. These indicators will allow you and your team to focus on what is *really* important: investing in the true value of water for your community.





7) Overcome Obstacles

Be prepared for resistance to change as well as legal and institutional obstacles. By using a little ingenuity, you can overcome even the most difficult barriers. For example, if some in your community have reservations about constructing a sewer sludge composting facility, produce a newsletter or seek expert assistance to help the community recognize the true value of their investment.

8) Revisit and Reassess

Decisions must be periodically revisited and assessed as water uses, services, and users change. New values and results from updated analysis should be incorporated into all decisions. For example, you may find that a one-time evaluation is not sufficient in determining the true value of your water supply. However,

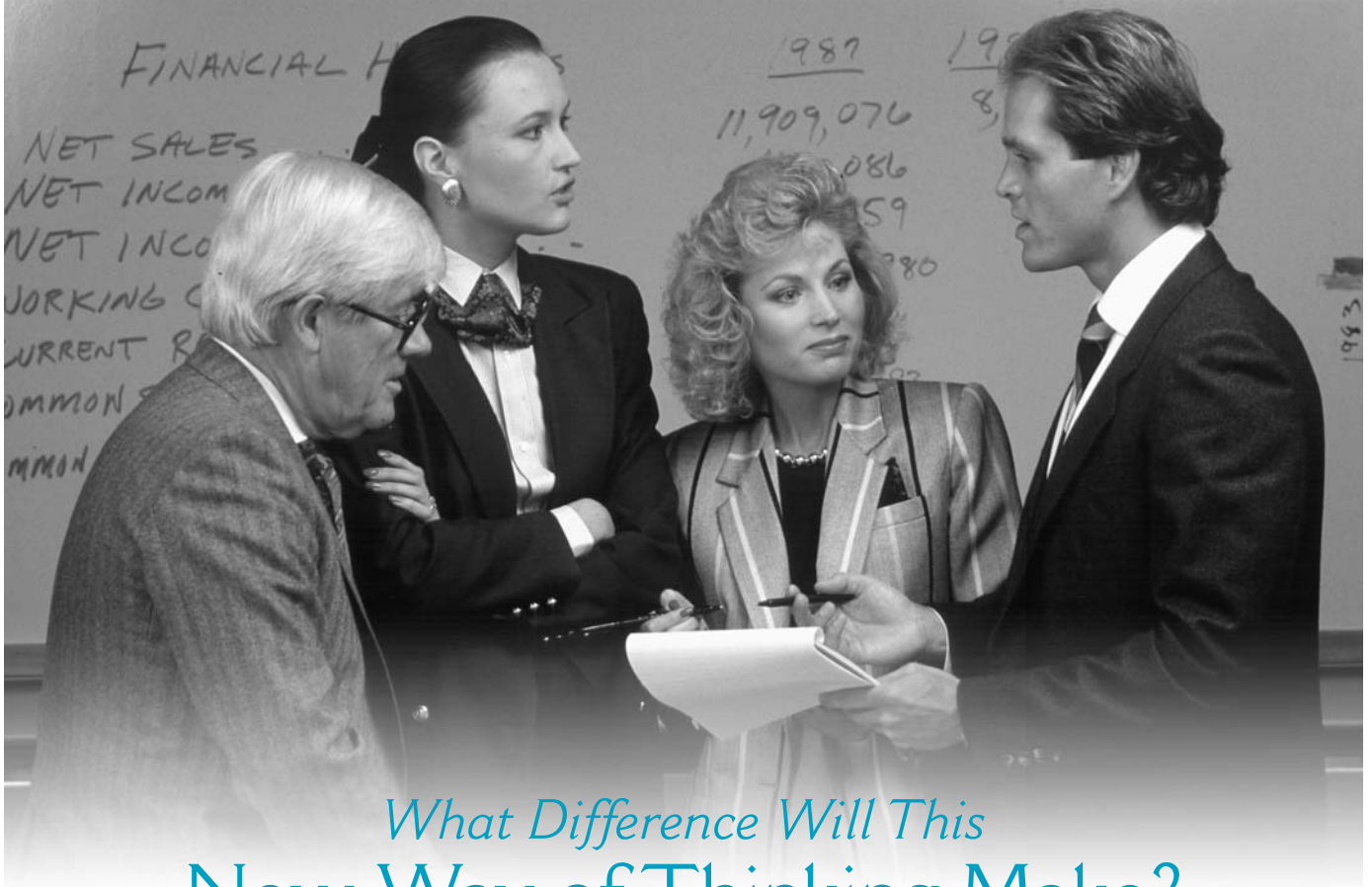
evaluations from several different groups over a period of time will provide varying input. This provides a broader view of your assets and gives you more options to pursue.

9) Think in the Long Term

Perhaps the most important step in valuing and protecting your assets is to continue your efforts in the future. Consider all the long-term values and benefits that your investments in these assets can provide for you and your community. By broadening your outlook on poten-

tial recognized and unrecognized values and services, you will realize the true future value of your water supply.





What Difference Will This New Way of Thinking Make?

If you can follow this approach, your decisions will be more informed and significant benefits will result, including:

- ❖ The return on your investment will be greater because the real value of water has been incorporated into decisions.
- ❖ Assets will be better used when the capability to leverage resources is enhanced.
- ❖ Customers will be more satisfied because your investments will yield greater benefits to them through the services provided.

- ❖ Using this innovative approach will create value to both you and your community because you have identified all the assets and services of your water supply.

It is important to remember the role that you play as custodian of the most precious resource on earth. By knowing the **real value** of water, you can make insightful investment decisions. And, by conveying the value of this resource to your community, you will receive the support needed to sustain and enrich your water supply.

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Valuing Services and Benefits

<i>Services and Benefits Provided</i>	<i>Value</i>
Health benefits to customers	<ul style="list-style-type: none"> ✧ Reduced medical costs ✧ Improved school and work attendance
Reduce risk from microbiological contaminants	<ul style="list-style-type: none"> ✧ Longer life span ✧ Increased customer satisfaction
Prevent salt increases	<ul style="list-style-type: none"> ✧ Lower regulatory scrutiny ✧ Lower monitoring costs ✧ More water recycling options
Nutrient removal	<ul style="list-style-type: none"> ✧ Reduced treatment cost ✧ Lower regulatory scrutiny ✧ Lower monitoring costs ✧ More sustainable ecosystem
Sediment removal / erosion prevention	<ul style="list-style-type: none"> ✧ Less road / flood channel maintenance ✧ Greater public safety / fewer traffic accidents
Flood flow retention in winter	<ul style="list-style-type: none"> ✧ Less property damage
Lower complaint rate	<ul style="list-style-type: none"> ✧ More staff time available to perform other functions ✧ More resources available to provide other services
Trust	<ul style="list-style-type: none"> ✧ Increased consumer confidence ✧ Better community support for activities that provide services
Willingness to support rate changes and system improvements	<ul style="list-style-type: none"> ✧ Ability to invest in assets that enhance services ✧ Maintain community competitiveness in economy
Enhance community supply	<ul style="list-style-type: none"> ✧ Lower corrosion of household plumbing ✧ Greater customer satisfaction ✧ Longer life, lower medical bills, etc. ✧ Less bottled water purchasing (more money for other things) ✧ Increased water supply
Reclamation and reuse of wastewater	<ul style="list-style-type: none"> ✧ Drought-proofing the community and its business sector ✧ Improved watershed protection ✧ Increased protection of receiving waters ✧ Enhanced energy conservation ✧ More jobs in locally controlled water source ✧ Increased reliability of community water supply
Aesthetic value to community	<ul style="list-style-type: none"> ✧ Higher property values ✧ Greater economic productivity (commercial and industrial, tourism, commerce, agriculture, etc.)
Increase recreational use	<ul style="list-style-type: none"> ✧ Greater recreational sales revenue (all commerce-related expenditures) ✧ Greater tourism expenditures / more local jobs ✧ More opportunities to watch birds, fish, etc.
Wildlife habitat	<ul style="list-style-type: none"> ✧ More sustainable ecosystem ✧ Greater natural productivity (more waterfowl and fish, etc.)
Landscape aesthetics	<ul style="list-style-type: none"> ✧ Higher property value ✧ Greater wildlife values ✧ More recreational use

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