



Informing Land-Use Planning in the Wappinger Creek Watershed

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Land-Use and Water Quality Are Connected

Watershed is the term that is used to describe all of the land that drains to a network of water bodies (Figure 1). Natural landscapes within watersheds, such as wetlands and forestland, slow, absorb, and filter water as it travels toward these water bodies. Land-use change can have a detrimental effect on water quality because natural landscapes are replaced by hardened, paved surfaces such as parking lots and roadways. As runoff from rain travels over hardened surfaces, it sweeps contaminants off the land and into water bodies, degrading water quality. This “nonpoint source pollution”, is one of the most challenging threats to our water and environment today. Careful land-use planning by local governments is one of the most important ways to protect watersheds from the potentially negative affects of land-use change.

The Role of Local Government

Local land-use decisions are influenced both by the collective decisions of landowners and municipal officials. A variety of policy tools exist which enable local governments to regulate local land-use activities and balance development with the conservation of valuable natural resources.

These tools include:

Regulatory and Authoritative Tools such as restricting development and passing local laws and ordinances.

Environmental Planning Tools such as including sustainable land-use planning principles in

comprehensive plans and conducting environmental monitoring.

Outreach and Education Tools such as using tailored messages to reach stakeholder audiences and holding educational workshops.

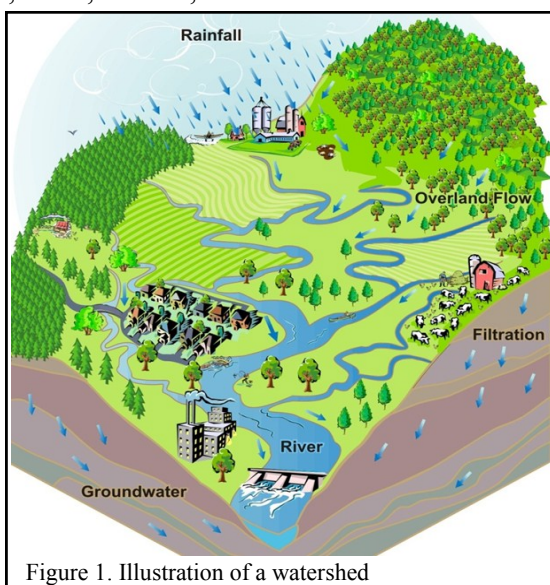


Figure 1. Illustration of a watershed

Incorporating Social Context into Planning

It is important to consider the social context of a community when designing strategies that address land-use planning and water quality issues. Policies and approaches that embrace local values and concerns are more likely to be accepted by the public and can help foster local partnerships in community watershed protection.

Designing informed strategies requires an understanding of stakeholder attitudes, perceptions, and motivations.

Informative Research

The Wappinger Creek Watershed is located in Dutchess County, NY and is one of the five major tributaries to the lower Hudson River. Nonpoint source pollution reduction has become a priority in the watershed as the impacts of increased population growth and land-use change have become evident. The 2000 Natural Resource Management Plan for the watershed recommends that current residential development practices be changed to avoid water quality degradation. A study was conducted in the Spring and Summer of 2009 to help understand what types of water quality protection approaches will be most acceptable in the watershed. A questionnaire was sent to 326 municipal officials and 1,422

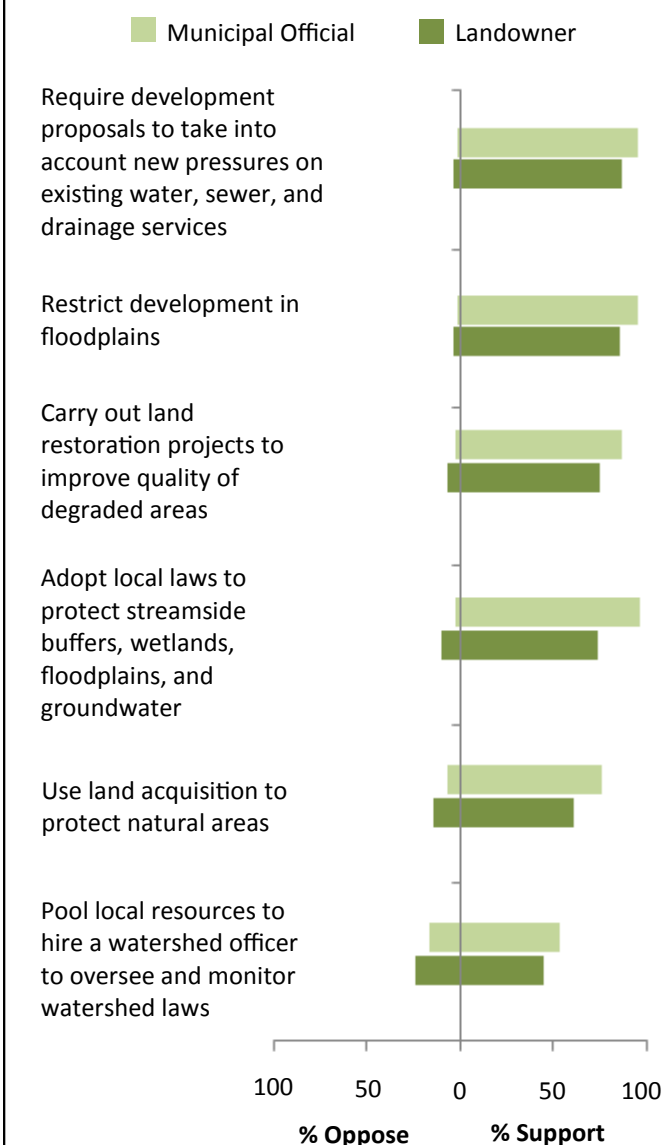


landowners in the 13 municipalities of the Wappinger Creek Watershed to inform outreach, education, and policy making in the watershed. This factsheet reports on the results of the survey related to the policy preferences of municipal officials and landowners. The Wappinger Creek Watershed can act as an example for others that aim to balance growth with watershed protection.

Municipal Official and Constituent Attitudes and Policy Tool Preferences

To learn about stakeholder policy preferences related to water quality, municipal officials and landowners were asked about their support for various policy tools that can be employed in the watershed.

Figure 1. Support for Regulatory and Authoritative Policy Tools



Both respondent groups showed strong support for a variety of policy tools but their attitudes did differ for some of the tools (Figures 1, 2, and 3). Stakeholders find many types of policy tools acceptable, including those that impose restrictions.

Figure 2. Support for Environmental Planning Policy Tools

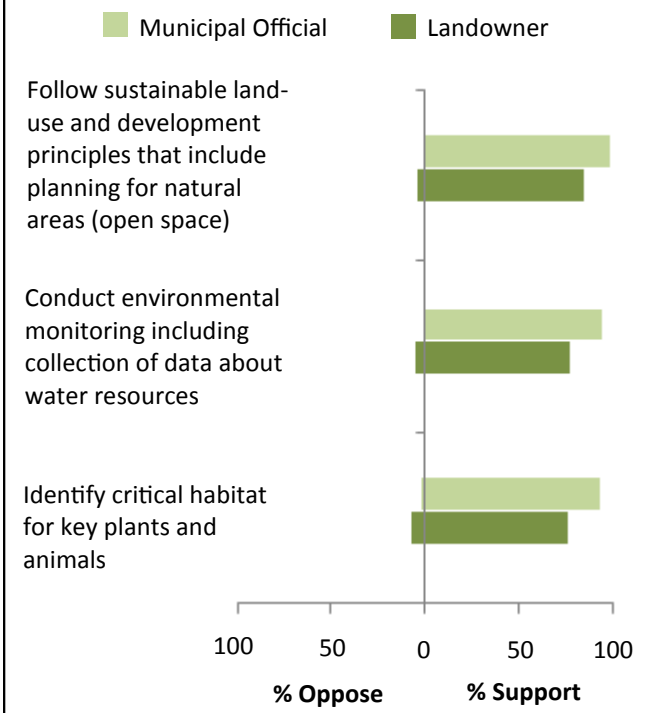
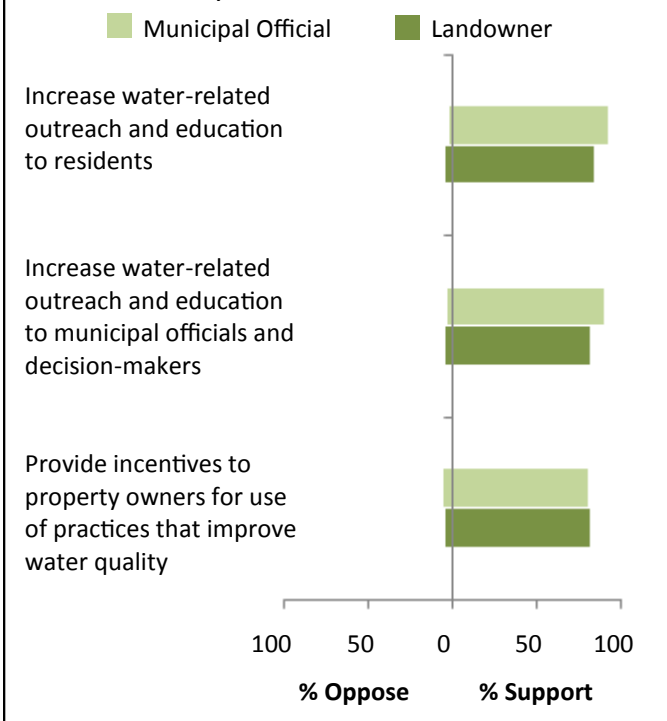


Figure 3. Support for Outreach, Education, and Incentive Policy Tools

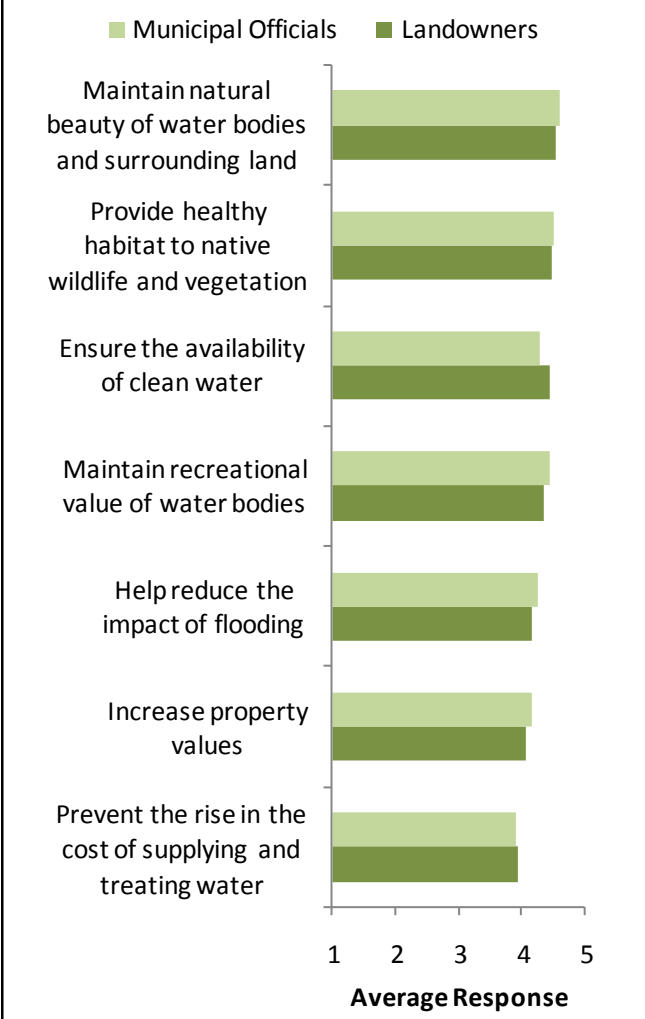


Graphs on this page show strongly disagree and disagree (oppose) and agree and strongly agree (support) responses. They do not show neutral and don't know responses.

Attitudes about Water Resource Protection

Both municipal official and landowners agreed that there are many possible benefits that can be achieved by protecting water resources (Figure 4). They agreed that protection can help maintain the natural beauty and recreational value of water bodies, provide healthy habitat, increase property values, prevent a rise in the cost of supplying and treating water, and ensure the availability of clean water. Landowners were more confident than municipal officials about water resource protection keeping water treatment costs low.

Figure 4. Attitudes about Multiple Benefits of Water Resource Protection

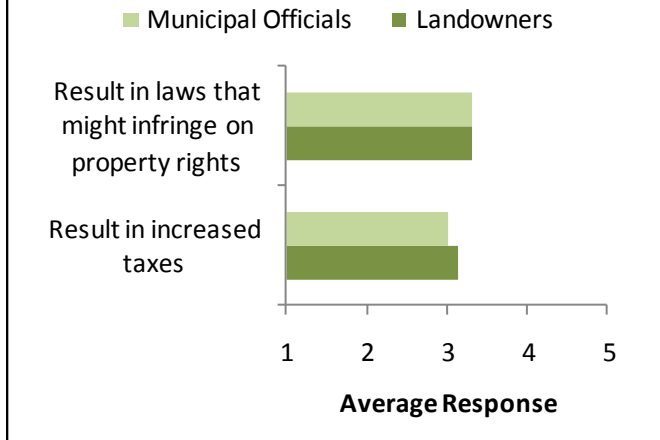


Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree
*Statistically significant difference at the $p < .05$ level

In addition to the multiple benefits of protecting water resources, there are some potential negative consequences: increased taxes and laws that might infringe on property rights. Responses by both stakeholder groups were highly dispersed (from strongly disagree to strongly agree) regarding the potential consequences of protection efforts that

resulted in average responses that were close to neutral (Figure 5). It should be noted that although protecting water resources does require tradeoffs, respondents had stronger attitudes about the benefits.

Figure 5. Negative Consequences of Water Resource Protection



Scale: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree
*Statistically significant difference at the $p < .05$ level

Who is Responsible for Water Resource Protection?

Landowners and municipal officials were also asked about their attitudes regarding the responsibility to protect water resources.

In separate questions, they were asked whether they agreed or disagree that:

- It is the responsibility of residents to protect water resources through the decisions they make about their property.
- It is the responsibility of the municipality to protect water resource through land-use laws.
- The responsibility to protect water resource should be shared by municipal officials and residents.

Many respondents agreed, to some extent, that the responsibility to protect water resources should be shared by local government and residents (municipal officials 78%; landowners 57%). Some landowners did express their opposition to local governments utilizing land-use laws to protect the watershed. Ten percent of landowners viewed watershed protection as their exclusive responsibility while 7% of municipal officials viewed it as their exclusive responsibility. On average, municipal officials expressed significantly more support for land-use laws and shared responsibility to protect the watershed than landowners, who showed the greatest preference for responsibility in the hands of residents.

Adequacy of Land-Use Laws

Municipal officials and landowners were asked to indicate their level of agreement regarding the adequacy of land-use laws in their municipalities. For municipal officials, 45% disagreed or strongly disagreed with the statement that there are adequate land-use laws. For landowners, 40% stated that they “don’t know” whether there were adequate land-use laws, 32% agreed or strongly agreed with the adequacy, and 15% disagreed or strongly disagreed. Landowners may not be accepting of new land-use laws if they believe the current ones are adequate. It is also apparent that landowners have low awareness about the laws that exist or what laws are needed to adequately protect water resources.

Loss of Natural Environment and Wildlife Habitat to Development

On average, both landowners and municipal officials agreed that loss of natural environments and wildlife habitat is a problem in the watershed (landowners 80%; municipal officials 85%). This may indicate that land-use policies are needed to protect habitat in the watershed from the negative impacts of development.

Drinking Water is Closely Tied to the Watershed

While approximately 50% of landowners and 70% of municipal officials agreed or strongly agreed that the quality of household drinking water in their municipality is connected to the quality of the water in the Wappinger Creek Watershed, others disagreed (landowners 18%; municipal officials 6%) or didn’t know (landowners 23%; municipal officials 13%). Drinking water comes from either surface (streams, rivers, or lakes) or groundwater sources (wells) and travels over and through the land before coming out of a tap. It is important that landowners and municipal officials understand that the quality of the water and land in the watershed has a direct impact on the water in many households in the watershed. Understanding the connection will make policies to protect the watershed more likely to be accepted.

What are the barriers to implementation?

Municipal officials were asked what barriers prevent implementation of policies to protect water resources in the watershed. While no single barrier was revealed as most prevalent, those with the highest average response on a scale of 1 to 5 were cost of implementation (3.82), lack of coordination among municipalities (3.79), and local political realities that would make implementation of such policies difficult (3.69).

Designing Socially Acceptable Land-Use Policies

It is important that local governments develop a strategy to protect their land and water from the potentially negative and often irreversible impacts of land-use change and development. Strategies should be tailored to the local context in terms of both physical and social realities. Understanding the attitudes of stakeholders will help to shape the strategy into one that is responsive to local needs and accepted by stakeholders. The benefits and consequences of water resource protection should be weighed, the responsibility for protection balanced, and the attitudes and barriers which underlie decision making understood. Based on the survey results in the Wappinger Creek Watershed, municipal officials, outreach professionals, and managers should consider:

- Capitalizing on landowner support for a variety of policy tools. Municipal officials and landowners agreed about restricting development in floodplains and requiring development proposals to take new pressures on the existing system into account.
- Conducting water quality and watershed management outreach and education for residents and municipal officials.
- Designing outreach messages that highlight the multiple benefits of water resource protection. Tradeoffs may be necessary to make water quality protection a priority in the watershed.
- Making accessible information about local land-use laws as well as gaps in protection in order to increase awareness about the adequacy of local laws to protect water resources.

References

Watershed graphic from <http://prairierivers.org/rivers/rivers101/>

For more information on the Human Dimensions Research Unit (HDRU), our program area, and past publications, please visit: www.dnr.cornell.edu/hdru.

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