



Geist Reservoir/Upper Fall Creek Watershed Management Plan

Delaware, Hamilton, Hancock, Henry, Madison and Marion Counties, Indiana

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Prepared for:
UPPER WHITE RIVER WATERSHED ALLIANCE

GEIST WATERSHED ALLIANCE



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Executive Summary

The Upper White River Watershed Alliance and the Geist Watershed Alliance has received funding from the Department of Natural Resources, Division of Fish and Wildlife Lake and River Enhancement Program for a Watershed Management Plan (WMP) for the Geist Reservoir and the Upper Fall Creek Watershed. The Geist Reservoir/Upper Fall Creek Watershed is located in Central Indiana, northeast of Indianapolis. Upper Fall Creek has its origins in northwest Henry County and flows southwest through Madison, Hamilton, and Marion Counties. The watershed also encompasses portions of Delaware and Hancock Counties. The Geist Reservoir/Upper Fall Creek Watershed consists of approximately 140,194 acres of mixed land use of which approximately 1,900 acres is Geist Reservoir.

Following the drought and subsequent toxic blue-green algal bloom during the summer of 2007, a number of concerned residents came together and began seeking solutions to prevent Geist Reservoir's problems from escalating; they formed the Geist Watershed Alliance (GWA). The Geist Watershed Alliance is a non-profit organization focused on the improvement and protection of Geist Reservoir's water quality. Its membership consists of many types of stakeholders seeking to ensure that the reservoir will remain a healthy recreational and drinking water resource within the Central Indiana region. As a means for achieving the goals GWA, the Alliance is operating in partnership with the Upper White River Watershed Alliance (UWRWA), and in alignment with local and state agencies/organizations goals in the development of this Watershed Management Plan. A Steering Committee of stakeholders within the watershed was organized to work with GWA and UWRWA to develop and implement the Watershed Management Plan.

The Geist Reservoir/Upper Fall Creek Watershed Management Plan (WMP) is intended as a guide for the protection and enhancement of the environment and quality of the Watershed while balancing the different uses and demands of the community on this natural resource. The plan will address items such as:

- education and outreach;
- increasing preservation, restoration and protection of this vital system;
- increasing cooperation, coordination and collaboration among all stakeholders in the Watershed; and
- maintaining a solid organization to look after the welfare of this important natural resource.

The WMP follows the Indiana Department of Environmental Management (IDEM) requirements for watershed management plans, including sections on: watershed inventory, identifying problems and causes, identifying sources and calculating loads, setting goals and identifying critical areas, choosing measures and BMPs to apply, creating an action register and schedule, and tracking effectiveness.

Watershed Inventory

The watershed inventory is a comprehensive inventory that quantifies, describes, and summarizes all available watershed data. This inventory is used to determine the current conditions of the watershed and identify the link between the stakeholder concerns and those watershed conditions. Part one of the watershed inventory focuses on the data at a watershed-wide scale and includes broad topics not easily summarized at the subwatershed scale. Part two of the watershed inventory provides detailed water quality data gathered at the subwatershed scale. And part three of the watershed inventory summarizes and explains the relationships of the data gathered in parts one and two.

Identify Problems and Causes

Problem statements were developed during the planning process in an effort to link watershed concerns with existing and historical water quality data. Six major concern categories were identified during this process.

1. Stakeholders in the Geist Reservoir/Upper Fall Creek Watershed are not knowledgeable about their daily impact on the watershed and its water quality.
2. Nutrient concentrations within all subwatersheds frequently exceed water quality standards thereby aiding the growth of algae within the reservoir.
3. Soil erosion and sedimentation within the watershed is degrading the water quality and limiting the aesthetics, wildlife habitat, and aquatic health of the streams and reservoir within the watershed.
4. There is a lack of funding for the implementation of Best Management Practices within urban areas.
5. Excessive growth of exotic aquatic plants within the reservoir is negatively impacting the recreational uses of the reservoir and the survival of native species.
6. *E. Coli* levels in the watershed regularly exceed the state standard, based on current and historical water quality data results, and often exceed safety standards for recreational use in streams.

Watershed Goals

Based on the identified concerns and possible sources, goal statements were developed for each problem statement. Implementation of policies and programs to meet these goal statements will improve watershed management in the Geist Reservoir/Upper Fall Creek Watershed. The goal statements indicate the ultimate goal for a specific project. In some cases this goal may not be obtainable in the short term; therefore there a list of short term and long term objectives were included with each goal.

1. Develop and implement an education and outreach program within the watershed.
2. Reduce *E. Coli* concentrations to meet the state standard of 235 CFU/100mL.
3. Reduce the nutrient loads so that there are no exceedances of EPAs suggested targets for Nitrate + Nitrite of 1.6 mg/L and Total Phosphorus of 0.076mg/L.
4. Reduce sediment loads to meet the IDEM statewide draft TMDL target of 30 mg/L for TSS.
5. Reduce and control the growth of exotic plants within the reservoir.
6. Identify and utilize existing BMP funding sources and encourage the development and enhancement of additional and non-traditional funding sources.

Watershed Critical Areas

Critical areas are defined as areas where project implementation can remediate current water quality impairments or reduce the impact of future water quality impairments. The critical areas within the Geist Reservoir/Upper Fall Creek watershed were identified based on the Watershed Inventory, the identified problems and the goals of the Watershed Management Plan. Critical areas were split into two categories: Subwatershed Critical Areas and Specific Source Critical areas.

High Priority Subwatersheds

Thorpe Creek
Honey Creek
Flatfork Creek
Sly Fork

Medium Priority Subwatersheds

Deer Creek
Prairie Creek
Headwaters Lick Creek

Low Priority Subwatersheds

McFadden Ditch
Foster Branch

Specific Source Critical Areas

Livestock Access
Absent or Insufficient Stream Buffers
Excessive Streambank Erosion
Agricultural Areas Practicing Conventional Till

Best Management Practices

To choose an appropriate BMP, it is essential to determine in advance the objectives to be met by the BMP and to calculate the cost and related effectiveness of alternative BMPs. Once a BMP has been selected, expertise is needed to insure that the BMP is properly installed, monitored, and maintained over time. BMPs identified for implementation within the Geist Reservoir/Upper Fall Creek Watershed were divided into two categories: Agricultural/Rural and Urban, with cost estimates and pollutant removal rates provided for each BMP.

Action Register and Schedule

The success of a watershed management plan can be measured by how readily it is used by its intended audience and how well it is implemented. The Geist Reservoir/Upper Fall Creek WMP is very ambitious and continued implementation of the plan will require and even greater degree of cooperation and coordination among partners and funding for projects. The action register is a tool used to easily identify each objective, milestone, estimated cost, and possible partners for easier implementation of the plan.

Acknowledgements

The Geist Reservoir/Upper Fall Creek Watershed Management Plan was made possible with funding from the Indiana Department of Natural Resources – Division of Fish and Wildlife – Lake and River Enhancement Program with cost share funds provided by the Upper White River Watershed Alliance and the Geist Watershed Alliance. DNR staff that provided information in preparation of this plan include: Gwen White, Angela Sturdevant, Greg Biberdorf, Rod Edgell, and Doug Nusbaum. Upper White River Watershed Alliance assistance was provided by Dr. Lenore Tedesco, Jill Hoffmann and Kelly Levensgood. Scott Rodgers with the Geist Watershed Alliance was also involved in the preparation of the Watershed Management Plan.

Additional Geist Reservoir/Upper Fall Creek Watershed stakeholders who participated in the study by attending meetings, providing input for the creation of the plan, etc., included: Kevin Kenyon, Ball State Facilities; Kent Duckwall, Geist Marina; Cindy Newkirk, Hancock County Soil and Water Conservation District; Shaena Reinhart, Hamilton County Soil and Water Conservation District; Kent Ward and Bob Thompson; Hamilton County Surveyor's Office; Kellie Harding, Henry County Soil and Water Conservation District; Richard Byers, Henry County Surveyor; Bonny Elifritz and Ernest Johnson, Indiana Department of Environmental Management; Angela Cowan, Indiana University Purdue University Indianapolis – Center for Earth and Environmental Science; Marija Watson, Indiana Wildlife Federation; Stephen Schmidt, Madison County Soil and Water Conservation District; Patrick Manship, Madison County Surveyor; Glenn Lange and Ron Lauster, Marion County Soil and Water Conservation District; Sharon Ferguson, Shorewalk Condo Association Dredging Committee; Bowden Quinn, Sierra Club; Jason Armour, Town of Fishers; Tim McClintick and Doug McGee, Town of Pendleton; Paul Whitmore, Veolia Water Indianapolis, LLC; Crist Blassaras and Judy DeLury, White River Watchers; Jo Biggers, Stephanie Box, Glenn Brown, William Ellingson, Dear Farr, Sarah Kempfer, Jhani Laupus, Matthew Newell, Nina Sidibe, Janice Snell, Wendy Thanisch, Victor Wakley, Watershed Residents. Authors of this report include Jessica Spurlock, Carrie Pintar, and Greg Wolterstorff, V3.

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Section 1 – Watershed Community Initiative

Intentions of the Watershed Management Plan

The Upper White River Watershed Alliance and the Geist Lake Coalition/Geist Watershed Alliance has received funding from the Department of Natural Resources, Division of Fish and Wildlife Lake and River Enhancement Program for a Watershed Management Plan (WMP) for the Geist Reservoir and the Upper Fall Creek Watershed in Delaware, Hamilton, Hancock, Henry, Madison and Marion Counties, Indiana.

The Geist Reservoir/Upper Fall Creek Watershed Management Plan (WMP) is intended as a guide for the protection and enhancement of the environment and quality of the watershed while balancing the different uses and demands of the community on this natural resource. The plan will address items such as:

- education and outreach;
- increasing preservation, restoration and protection of this vital system;
- increasing cooperation, coordination and collaboration among all stakeholders in the watershed; and
- maintaining a solid organization to look after the welfare of this important natural resource.

The WMP follows the Indiana Department of Environmental Management (IDEM) requirements for watershed management plans, including sections on: Watershed Inventory, Problems and Causes, Sources and Loads, Setting Goals and Identifying Critical Areas, Action Register and Schedule, and Tracking Effectiveness.

Public input is essential for the sustainability and success of the watershed improvement effort. Stakeholder and public input was sought and included during all aspects of the planning process. This local input was essential for developing a plan that would have broad appeal throughout the watershed and garner continued support. A steering committee and three sub-committees were developed to address the diverse needs in the watershed.

The Geist/Upper Fall Creek WMP is intended to be comprehensive; identifying problem areas and suggesting improvement measures for both water quality and quantity concerns. The watershed is large and diverse, and thus has a variety of issues and concerns that need to be addressed. To address some of these issues, the Steering Committee will work with local stakeholder groups to pursue Best Management Practices (BMPs) that will result in the improvement of water quality within the watershed. Because of the size of the task at hand, this plan will also be used as a platform upon which to pursue additional grants and other funding for implementation of the many different improvement measures recommended in the plan.

Community Involvement

Geist Lake Coalition/Geist Watershed Alliance

The Geist Lake Coalition was established in 2000 and evolved from a property owners association Lake Committee. Following the drought and subsequent toxic blue-green algal bloom during the summer of 2007, a number of concerned residents came together and began seeking solutions to prevent Geist Reservoir's problems from escalating; they formed the Geist Watershed Alliance (GWA).

The Geist Watershed Alliance is a non-profit organization focused on the improvement and protection of Geist Reservoir's water quality. Its membership consists of many types of stakeholders seeking to ensure that the reservoir will remain a healthy recreational and drinking water resource within the Central Indiana region.

As a means for achieving the goals of public awareness and improved water quality, the Alliance is operating in partnership with the Upper White River Watershed Alliance, and in alignment with other community watershed groups in the development of this Watershed Management Plan. To help achieve their objectives three sub-committees have been formed to spearhead and guide the activities necessary. These sub-committees include:

1. Education and Outreach/Awareness and Communications Sub-Committee
2. Fund Raising Sub-Committee
3. Product/Services Sub-Committee

Upper White River Watershed Alliance

The Upper White River Watershed Alliance (UWRWA) was formed in 1999 through a local municipal initiative. Not long thereafter, a substantial fish kill occurred as a result of a pollution incident along the White River near Anderson, Indiana. Public and municipal concern regarding overall water quality in the river continued to rise. Current urban development pressures, concern for the quality of area water supplies, and other use impairments drive the Alliance's activities.

The Geist Reservoir and Upper Fall Creek Watersheds lie within the Upper White River watershed boundary, and therefore the information within this WMP is important to incorporate into the ongoing work for the Upper White River. The watershed coordinators and other members of the UWRWA have participated in the Geist/Upper Fall Creek Steering Committee and helped facilitate communication between each group. The website for the Geist/Upper Fall Creek Steering Committee is hosted by the UWRWA so that communication at a single point could occur. The improvements recommended by this WMP and implemented within the Geist/Upper Fall Creek watershed will ultimately provide benefit to the Upper White River. Additionally, these communities have very similar demographics and a coordinated education and outreach program between the Upper White and Geist/Upper Fall Creek will help get a broader message to the people that live within these watersheds.

Steering Committee

Mission/Vision Statement

As part of the watershed planning process, the Steering Committee developed a mission statement in order to clearly define the groups' goals and objectives. The mission statement was referenced during the development of this watershed management plan and is included below.

The Geist Watershed Alliance mission is to create ecological awareness, unite private citizens, public groups, and government agencies and promote outreach and stewardship in a collaborative effort to protect water quality, achieve environmental standards, and maintain all beneficial uses of the Geist Reservoir and its watershed.

The Upper White River Watershed Alliance's vision is to become the principal regional watershed leader by creating resources, education programs and partnerships, that promote, protect, and enhance the biological, chemical, and physical integrity of the White River ecosystem.

The stakeholders of the Geist Reservoir/Upper Fall Creek Watershed have many important partners in conservation including:

- Geist Watershed Alliance (GWA),
- Upper White River Watershed Alliance (UWRWA),
- Indiana University Purdue University Indianapolis (IUPUI) – Center for Earth and Environmental Science (CEES),
- Indiana Department of Natural Resources (IDNR) ,
- Indiana Department of Environmental Management (IDEM),
- Indiana Wildlife Federation (IWF),
- White River Watchers,
- Sierra Club,
- Veolia Water Indianapolis, LLC,
- Hamilton County Soil and Water Conservation District,
- Hancock County Soil and Water Conservation District,
- Henry County Soil and Water Conservation District,
- Madison County Soil and Water Conservation District,
- Marion County Soil and Water Conservation District,
- Hamilton County Surveyor,
- Madison County Surveyor,
- Town of Fishers, and
- Town of Pendleton

All County SWCD representatives and Surveyor's were invited to the initial Steering Committee meetings. Not all counties chose to participate in the plan process. A task item for further coordination with Ag stakeholders in the watershed is included in the Public Participation/Education and Outreach goal. A complete list of stakeholder groups and related organizations is available in Appendix C of this document.

A representative from each of the stakeholder groups listed above, along with individual residents, comprises the Geist Reservoir/Upper Fall Creek Watershed Steering Committee. The steering committee's purpose is to review the concerns from the public meetings, guide the development of the management plan, and provide additional data as requested. They meet on a monthly or bi-monthly basis to accomplish these goals. The Steering Committee meeting agendas, sign-in sheets and minutes are available in Appendix D.

Steering Committee Planning Process

As stated previously, public input is essential for the sustainability and success of the watershed improvement effort. A steering committee was formed to review the concerns from the public meetings and guide the development of the management plan.

Plan Development

The steering committee was directly involved in all aspects of the development of the plan, including input at public meetings, steering committee meetings, and completion of the windshield surveys. The following steps were used in the development of the plan for the Geist Reservoir/Upper Fall Creek Watershed.

- Outreach to stakeholders
- Develop watershed management partnership with relevant stakeholders
- Identify and collect existing studies and other watershed data
- Solicit public input on watershed problems and opportunities
- Summarize existing watershed data
- Formulate project goals and objectives for watershed plan
- Collect new data where needed
- Complete assessment of watershed conditions
- Identify best management practices and policies appropriate for the watershed
- Develop an action plan recommending watershed improvement projects and policies
- Identify potential funding sources for watershed improvements
- Obtain public official and general public input from review of draft watershed plan
- Develop implementation schedule and complete final watershed management plan

Public Meetings

A Public Meeting was held on May 21, 2009 at Geist Elementary School to address the concerns of stakeholders in the Geist Reservoir/Upper Fall Creek Watershed. Twenty-six people were in attendance which included members of the steering committee, industrial and commercial businesses representatives, governmental entities, and home owners along Geist Reservoir.

A second Public Meeting was held on January 20, 2010 at the Pendleton Community Public Library to address the concerns of stakeholders in the Geist Reservoir/Upper Fall Creek Watershed. Ten people were in attendance which included members of the steering committee and representatives from governmental agencies. It should be noted that there were no land owners/stake holders in attendance at this meeting and therefore stake holder input was not provided.

At the public meeting, stakeholders were informed of the purpose of a Watershed Management Plan, informed on the planning process, updated on the Steering Committee progress, and given the opportunity to evaluate the priority resource concerns for the Geist Reservoir/Upper Fall Creek Watershed.

The priority resource concerns that were identified during the public meetings are listed below. Specific concerns were taken from the stakeholders and later listed in categories to aid understanding of the issues. The information will be used to prioritize watershed issues and aid in the planning and implementation process. Once stakeholders finished identifying issues and concerns they were given the opportunity to rank their top three issues. A value of 3 represented their highest priority issue. Ranking is provided in parenthesis in the format of: (total value / number of votes).

Water Pollution/Water Quality Issues:

- Quality of drinking water (3/1)
- Organic debris entering waterways
- Quality of surface water runoff

Development/Urban Issues:

- Erosion control and enforcement – Rule 5 (5/3)
- Sediment from storm drains (4/2)
- Encourage and improve public perception of native landscaping (4/2)
- Maintenance of culverts and roadways (1/1)
- Changing actions/perceptions towards fertilizer use
- Dredging in the reservoir

Wildlife/Habitat Issues:

- Enhance wildlife habitat and recreational uses of reservoir (1/1)

Watershed Education and Outreach:

- Encourage public participation (16/7)
- Outreach that is solution based (6/3)
- Education to the public (5/2)
- Education to the recreational users at marinas

Aquatic Plant Issues:

- Exotic species control – Eurasian Watermilfoil (3/2)
- Public concern over blue – green algae

Administrative Issues:

- Legislative action on phosphorus ban (21/9)
- Lack of funding sources for urban areas (16/7)
- Recognition of problems at State level (4/4)
- Lack of phosphorus regulations

The Public Meeting agendas and sign-in sheets are available in Appendix E.

During the development of the Watershed Management Plan, concerns that were not identified during the Public Meetings were added based on input from the Steering Committee and/or watershed data analyzed. These additional concerns are listed below:

- Lack of agricultural stakeholders
- Lack of sufficient buffers
- Streambank erosion
- Lack of conservation tillage
- Livestock access to streams