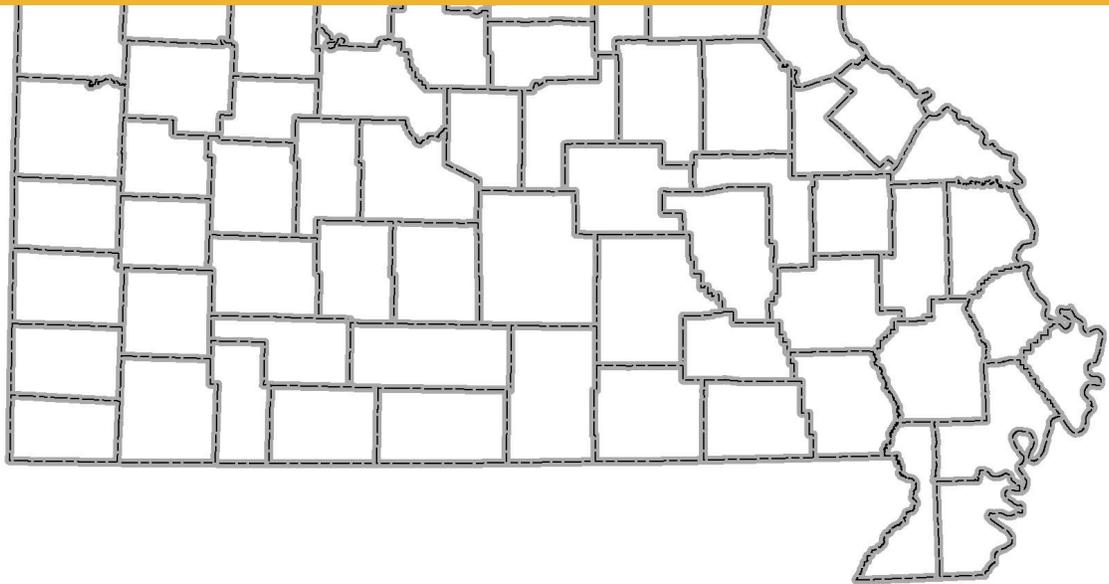


## Healthy Watershed Plan

### North Fork Salt River Watershed



The Missouri Department of Natural Resources seeks to improve the availability of water resource information to communities where impact to these water resources is felt most.

The information presented in this summary is intended to increase awareness of how activities on land and in water have an influence on water resource quality and quantity. The department greatly values local input and engagement regarding the mission of ensuring safe and ample water resources, and will continue to seek local guidance to further focus department efforts and funding strategies for the betterment of *Our Missouri Waters*.

# North Fork Salt River Watershed

Healthy Watershed Plan

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# North Fork Salt River Watershed

## Healthy Watershed Plan

### Purpose of Plan

The North Fork Salt River Watershed Healthy Watershed Plan reflects the perspective, ideas, desires and vision of the stakeholder participants. The healthy watershed plan has been created to help guide future efforts in maintaining and improving water quality in the North Fork Salt River Watershed.

## Key Points

The North Fork Salt River Healthy Watershed Plan is presented as the result of hundreds of hours of work on the part of participants, presenters, and planners. A part of the Our Missouri Waters collaborative, Mark Twain Regional Council of Governments working with the Missouri Department of Natural Resources created this document. This plan is created with input from local stakeholders. It is created through the work of those same stakeholders with the assistance and technical resources of the Mark Twain Regional Council of Governments and the Missouri Department of Natural Resources, in association with the Northeast Missouri Regional Planning Commission.

Planning for the future of the North Fork Salt River Watershed, planning for future activities in the watershed, and planning for future initiatives in the watershed *through stakeholder involvement* formed the foundation of the creation of the healthy watershed plan. Several hundred potential stakeholders were individually invited to participate in the initial meetings and approximately one hundred stakeholders attended at least one of the meetings. Ultimately, the plan was presented to, and approved by, the stakeholders as described later in this document.

Seven stakeholder meetings were held in various locations in the watershed. At these meetings, technical presentations about pertinent topics were made. Also, information about the desires and priorities of the participants was gathered. In this manner, information was shared with and gathered from stakeholders. Various tools for feedback were employed ranging from casual discussion to formal survey instruments.

The plan identifies “Guiding Principles” which will ideally help guide decision making for the watershed and a list of issues identified for the watershed. Both the guiding principles and issues lists were created and ranked in importance by the stakeholders. Specific goals and recommendations were brainstormed for each guiding principle and issue. Goals and recommendations were developed with a consensus, not to imply they had unanimous support. Each recommendation was found to have merit by one or more of the stakeholders. Recommendations were ranked in importance by the stakeholders, and recommendations will require additional work on someone’s part.

The continuation of a local watershed advisory committee was discussed at several meetings and particularly at the last meeting. The stakeholders that attended the last meeting were asked if the North Fork Salt River Watershed should continue to have an established local advisory committee. Twelve stakeholders voted on this question and 58% of the voting stakeholders voted “Yes”, 25% voted “Maybe”, and 17% answered “No”. Most (67%) voted that this committee should meet twice/year, 22% voted for an annual meeting, and 11% voted for a quarterly meeting. One idea is to continue the partnership with the Mark Twain Regional Council of Governments to assist stakeholders in continuing their committee and supporting their recommendations.

# North Fork Salt River Watershed

Healthy Watershed Plan

## Land Use of the Watershed

Land use is approximately 40 percent cropland, 37 percent grassland, 14 percent forest, 5 percent developed, 3 percent wetland, and 1 percent water. The northern portion is characterized by rolling hills and dominance of pasture, while the southern portion has less steep terrain and is dominated more by row crop agriculture. Claypan soils are predominant in the region and have very high runoff potential.

## Communities of the Watershed

Communities that are completely in the watershed include Brashear, Gibbs, Leonard, Lentner, Shelbyville, Shelbina, Clarence, and Stoutsville. Communities that lie partially within the watershed include Kirksville, Greentop, Queen City, Millard, La Plata, Hunnewell, and Goss. The estimated population of the watershed was 26,953 in 2000 and 27,588 in 2010.

## Location of the Watershed

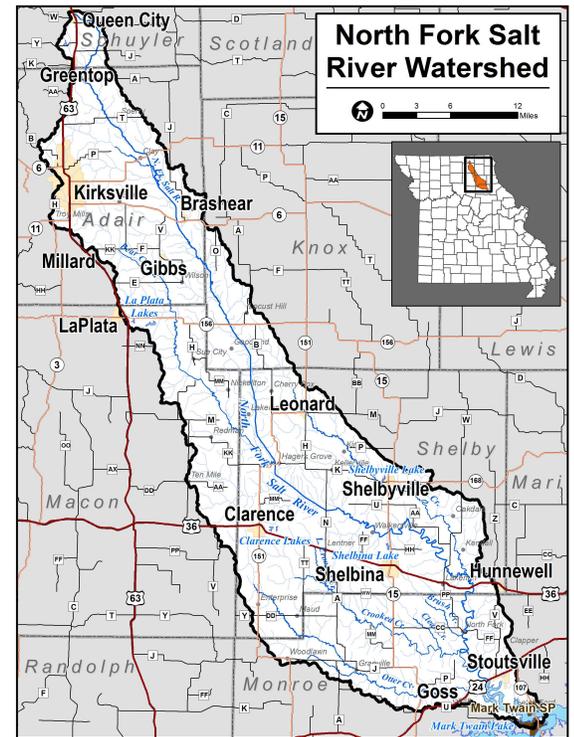
The North Fork Salt River Watershed is 894 square miles (572,160 acres) in size and includes parts of six counties in northeast Missouri, including Schuyler, Adair, Knox, Macon, Shelby, and Monroe counties. The North Fork Salt River Watershed composes 32 percent of the Salt River Basin. Proportionately 37.2% of the watershed is in Shelby County, 22.4% in Adair County, 20.9% in Monroe County, 11.6% in Macon County, 5.9% Knox County, and 2% in Schuyler County.

The North Fork Salt River and its headwaters originate in south-central Schuyler County, where 17.4 square miles of the county are part of the watershed. The North Fork Salt River flows south from Schuyler County and enters Adair County, which contains 200 square miles of the watershed. In Adair County, Bee Branch, Floyd Creek, Steer Creek, Lost Creek, Hog Branch, and Timber Branch join the North Fork Salt River. Bear Creek, a major tributary in the watershed, flows southeasterly from Kirksville and flows south into Macon County and then into Shelby County where it joins the North Fork Salt River near Hagers Grove.

In Macon County, 104 square miles of the county contribute to the watershed, including parts of the sub-watersheds of Titus Creek, Saling Branch, Bear Creek, Goodson Branch, Byar Branch, Ten Mile Creek, and Otter Creek. Fifty-three square miles of Knox County contribute to the watershed, including the headwaters of Black Creek, the Muddy Fork sub-watershed and parts of the Saling Branch, Big Deer Branch, and Twomile Creek sub-watersheds.

The majority of the land area of the watershed, 333 square miles, is in Shelby County. Black Creek flows southeast through the central portion of the county and joins the North Fork Salt River northeast of Hunnewell. Tributaries to Black Creek include Perry Branch, Hilton Branch, Gray Branch, Pollard Branch, Parker Branch, Oak Dale Branch, and Baker Branch. Ten Mile Creek, Sink Branch, Briggs Branch, Hale Branch, and Thomas Creek also join the North Fork Salt River in Shelby County. Jackson Creek, Brush Creek, Horseshoe Branch and Crooked Creek originate in Shelby County and flow into the North Fork Salt River in Monroe County.

In Monroe County, 187 square miles contribute to the watershed. Clear Creek and Duncan Creek join Crooked Creek in Monroe County, and Otter and Little Otter Creek flow from Shelby County into Monroe County. Deer Creek, Crutcher Branch, Buck Creek, Dales Branch and Otter Creek join the impounded North Fork Arm of Mark Twain Lake in Monroe County. Approximately 42 percent of the 119 miles of the North Fork Salt River has been channelized, from north of Lentner in Shelby County upstream through northern Adair County.



# North Fork Salt River Watershed

## Healthy Watershed Plan

### Previous Planning Efforts in the Watershed

The Clarence Cannon Wholesale Water Commission has completed a source water protection plan that identifies potential sources of pollutants within the watershed. Water quality concerns include high total organic carbons, turbidity spikes, nutrient and herbicide runoff, elevated atrazine levels, sedimentation, maintenance of water quality for recreational use and loss of forest, fish and wildlife resources. A Watershed Restoration Action Strategy was completed during 1999 to 2000 and a steering committee and technical resource panel existed as part of this work. This strategy identified the different roles and proposed actions for various partnering agencies/groups as they relate to public outreach and water quality improvement. Also, a nine element watershed plan for the Black Creek Watershed has recently been completed by a local steering committee. The City of Shelbina also has an active source water protection plan for Shelbina Lake.

## Uses and Impairments of the Watershed

The watershed drains to Mark Twain Lake which provides 18,600 acres of water for boating, fishing, public drinking water and serves as a source for hydroelectric power. Mark Twain State Park and Historic Site and additional public land provide thousands of acres for camping, hiking, fishing, picnicking and hunting. Canoeing opportunities are available on the North Fork Salt River, predominately downstream from the Arrow Wood Conservation Access in Shelby County.

Fisheries surveys since the 1950's have documented the presence of 64 fish species in the watershed. Surveys for mussels have found over 20 species of mussels in the watershed since 1977. Sportfish, including catfish, crappie, largemouth bass, white bass, and walleye are found in the North Fork Salt River.

The watershed serves as source water for the Clarence Cannon Wholesale Water Commission water treatment plant, which is located on the North Fork Salt River Arm of the lake near Florida. The water treatment plant is capable of treating 10 million gallons of water per day. The commission was established in 1983 and began selling water in 1992. The commission currently provides approximately 4.2 million gallons of clean drinking water each day to approximately 73,000 people in 14 counties in northeast Missouri, which includes 14 cities and nine rural water districts that are members. There are 12 community public water systems in the watershed, all of which use surface water for their supply. Two of these systems, Kirksville and Shelbina, treat their own water from local city lakes and the remaining nine systems purchase treated surface water, many of these purchasing water from the Clarence Cannon Wholesale Water Commission.

Within the watershed, two water bodies are currently on the state's 2014 303(d) list of impaired waters. The two water bodies listed as impaired include 19.4 miles of Black Creek in Shelby County (impairments include elevated *E.coli* and low dissolved oxygen) and Mark Twain Lake (impairment includes mercury in fish tissue from atmospheric deposition). Bear Creek in Adair County was first listed on the 2002 303(d) list of impaired streams when fisheries surveys indicated impairment of the fish community and low dissolved oxygen readings were measured in the stream. A TMDL (Total Maximum Daily Load) has been developed for Bear Creek that identifies point and non-point sources in the watershed and establishes pollutant allocations and recommended load reductions for sediment, nutrients and biochemical oxygen demand that should be implemented for Bear Creek in order to protect and restore the aquatic life in the stream. The City of Kirksville wastewater treatment facility (WWTF) discharges to Bear Creek and is currently upgrading their WWTF to meet more stringent water quality requirements. Also, a TMDL for *E. coli* impairment in Black Creek in Shelby County is currently being developed. The Shelbyville WWTF discharges to Black Creek and the city is currently working on upgrading their lagoon system to meet effluent *E.coli* limits and other permit limits.



# North Fork Salt River Watershed

Healthy Watershed Plan

## Healthy Watershed Meetings

### Healthy Watershed Meetings

Healthy Watershed Meetings were held between October 2015 and May 2016. Meeting locations included Kirksville, Shelbina, Mark Twain Lake, and Leonard.

The initial public meetings for the North Fork Salt were held on October 19, 2015 and October 20, 2015 in Kirksville and Shelbina, respectively. Two (2) meetings were held based solely on the size of the North Fork Salt River Watershed and in an effort to involve as many local residents as possible in this effort. Over 400 invitations were sent by mail from the Mark Twain Regional Council of Governments to identified possible stakeholders, and the meetings were announced in local media. Thirty-nine people attended the Kirksville meeting and fifty-five attended the Shelbina meeting. The meetings were identical in approach and presentation. The presenters were Mary Culler, Environmental Specialist with the Missouri Department of Natural Resources, and Bob Broz, State Water Quality Specialist with University of Missouri Extension. The presentations covered information about the Our Missouri Waters effort and watersheds and watershed planning in general.

The second meeting was held at the office of the Clarence Cannon Wholesale Water Commission on November 17, 2015. Approximately 100 invitations were sent by regular mail, including everyone who attended either of the first two meetings. There were twenty-seven in attendance. Presentations were made by Mark McNally, General Manager of the Commission regarding the water treatment process and by Dan Obrecht, Senior Research Associate with the University of Missouri about the quality of the water in Mark Twain Lake and the Lakes of Missouri Volunteer Program. Scott Allen, on behalf of the Commission, gave the group a tour of the Cecil V. Fretwell water treatment plant.

The third meeting was held on December 16, 2015 at the M.W. Boudreaux Visitor Center at Clarence Cannon Dam. Attendees were invited via email to this meeting with the exception of those who did not indicate that they had an email address and those were sent invitations by regular mail. Twenty-five were in attendance. Mr. Russell Errett, Water Control Manager with the U.S. Army Corps of Engineers gave a presentation about Mark Twain Lake including information about sedimentation, pool levels, and history and purpose of the lake.

The fourth meeting was held at the Community Center in Leonard on January 29, 2016. Thirty people, invited primarily by email, were in attendance. Ross Dames, MDC Fisheries Management Biologist, made a presentation about aquatic life in the watershed. Casey Bergthold of Quail Forever, overviewed conservation programs and introduced Jarrell Foreman with the Shelby County Farm Service Agency who discussed the CRP program. An optional tour of the Leonard wastewater treatment system was provided by Elke Boyd, SKW, Inc.

The fifth meeting, on March 3, 2016, was held in Leonard. There were no presentations as brainstorming for goals and recommendations was the only agenda item for attendees. There were twenty people in attendance.

The sixth and final meeting was held in Leonard on May 5, 2016. There were no outside presentations as the group went over the draft North Fork Salt River Healthy Watershed Plan and used Turning Point voting software to rank their recommendations. There were 21 people in attendance.

# North Fork Salt River Watershed

Healthy Watershed Plan

## Healthy Watershed Planning Process

### Survey Results from the first meetings in Kirksville and Shelbina

Twenty-three attendees of the Kirksville meeting and 38 attendees of the Shelbina meeting completed the survey, for a total of 61 completed surveys. Of these 61 completed surveys, 40 (66%) were interested in attending future meetings, 15 (24%) were maybe interested in future meetings and 6 (10%) said they were not interested in attending future meetings. Of the 61 completed surveys, 17 people replied that they did not want to participate on the local watershed advisory committee (these were mostly high school students and state or federal agency staff) and 36 people responded that they were or might be interested in participating on the local watershed advisory committee. Attendees were also asked to provide their contact information (mailing address, phone number, and email) so that they could be contacted for future meetings.

At the first two meetings held in October, attendees were given three index cards each, and were asked to write a word, phrase, or sentence that is something they think of when they think of the North Fork Salt River Watershed. This was done to help understand the initial thoughts and opinions of the attendees at the beginning of the series of meetings. The ideas expressed on these cards included descriptions of the watershed, concerns about the watershed, ideas on actions needed in the watershed, and questions or comments about the watershed meeting.

Descriptions of the watershed from the first two meetings included the following paraphrased comments:

- A very productive agricultural watershed
- An important source of drinking water for the public
- A stream that floods/has very high flow that impacts agriculture, roads/bridges, and wildlife
- A channelized stream that is degraded and can have low aquatic biodiversity
- A stream that is very muddy at any big rain
- A watershed of beauty that provides fish, game, recreation and sporting opportunities

Potential concerns identified at the first two meetings included the following ideas:

- Soil erosion
- Excess nutrients and algae growth
- Bacteria and pollutant levels for fish consumption
- Atrazine and pesticide runoff
- Concerned about city sanitary sewer system meeting state and federal requirements and funding for regulatory requirements
- Loss of stream-side forests and other buffer zones along rivers and streams
- Habitat degradation
- Flooding
- Private property rights and regulations

Potential ideas identified at the first two meeting included the following ideas:

- Terraces and flood control structures such as ponds, catch-basin, and lakes
- Cover crops and no-till
- Buffer strips
- Livestock exclusion practices
- Appropriate land application of wastewater
- Improved public access to the stream and a public trail system.
- Financial and technical resources to all landowners and meet with landowners face to face to discuss options that are available for watershed management.
- Involvement of people living in communities too.
- More medication turn-ins need to be hosted multiple times a year.
- Watershed education that's interesting and fun.

The attendees of the first two meetings were given a written survey that asked if they would like to come to future meetings or be on the watershed committee, and if so, what time or date of the week was most convenient for them. The survey also asked attendees what information they would like to know more about for the watershed, what people should know about the watershed, and if there were other people that they would suggest be involved in the meetings. The survey also asked attendees if they wanted to participate in the future in some other way (outreach events, have a demonstration site on their property, etc.).

# North Fork Salt River Watershed

## Healthy Watershed Plan

### Most Important Issues and Guiding Principles voted on by the local watershed advisory group

#### Issues

- Flooding / Rate / Volume of Water (14 votes)
- Funding – Sources / Uses (10 votes)
- Education and Outreach (9 votes)
- Sediments/Turbidity (6 votes)
- Nutrients (1 vote)
- *E. coli* (0 votes)

#### Guiding Principles

- Agriculture Sustainability Crops, Soil, Livestock, Profit (13 votes)
- Property Rights (9 votes)
- Water Quality (8 votes)
- Education/Outreach/Continued Education and Data Collection (5 votes)
- Local Control (5 votes)
- Fish and Wildlife (2 votes)
- Basin Flow Management (0 votes)

## Identification of Issues and Guiding Principles

At the second Healthy Watershed meeting held in November, attendees were provided with a summary of the comments received from the Kirksville and Shelbina meetings. The floor was opened for general discussion about things that struck the group as important and what information the group felt was needed going forward. Specifically, discussed were possible presentations from other watershed groups and from a stream biologist, and ensuring the necessary people were involved like city personnel. Appreciation of this effort was voiced by an attendee as this was seen as a way to stay ahead of the curve for the future.

At the third Healthy Watershed meeting in December, the large group was divided into four groups for the purpose of brainstorming issues and priorities for the watershed. “Issue” was defined as a problem or something that needs to be fixed in the watershed. A “priority” was defined as “What is most important and meaningful that you will not sacrifice in pursuit of something else”. Each table then reported their lists of issues and priorities and these were recorded and projected in the front of the room. Each named issue or priority was expanded upon by the group that had named it. This resulted in a list of priorities and issues which resulted from each small group’s discussion. The list was intended to provide a springboard for future discussions regarding issues, priorities, goals and recommendations.

At the fourth Healthy Watershed meeting that was held in late January, the lists of issues and priorities from the December meeting were provided to attendees and the group refined the lists of issues and priorities into main topic ideas. Priorities were re-defined as “Guiding Principles”. The refined lists of issues and guiding principles were posted on the wall. The attendees then voted on the issues and guiding principles that they felt were most important by placing two sticky dots (two each for the issues list and two each for the guiding principles list) next to the topics they felt were most important.

## Identification of Goals and Recommendations

At the fifth Healthy Watershed meeting, the attendees worked to develop goals and recommendations for the lists of issues and guiding principles. Goals were defined as something that you desired but which has not yet been achieved. Recommendation was defined as a specific action which could help accomplish the goal under which it is listed. A table was labeled for each of the six issue topics. Attendees selected the table and topic that they wanted to work at and individually developed goals for that topic. Then as a group, recommendations were developed for each goal. Approximately 10 minutes were allotted for this activity at each table, and then attendees switched tables to the next table of their choice. Three rounds were done for the issues list, and then the tables were re-labeled with the seven guiding principles, and three rounds of brainstorming goals and recommendations were done for the guiding principles.

For purposes of creating the written plan, an overarching goal for each guiding principle and issue was written by combining the goals provided individually by the attendees of the fifth meeting. Recommendations for each guiding principle and issue were listed under each overarching goal, using the exact wording provided by participants of the fifth meeting. Where recommendations under a specific guiding principle or issue were exact duplicates or essentially the same, these recommendations were combined into one single recommendation under the overarching goal for that guiding principle/issue.

# North Fork Salt River Watershed

## Healthy Watershed Plan

### Guiding Principles

Because the guiding principles developed by the group will be the foundation for guiding activities to address issues in the watershed, the goals and recommendations for the guiding principles will be presented first.

The guiding principles and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. Where there was a tie, those recommendations have equal rank (\*). The percentage of the voting points received for each recommendation is listed in the parentheses after the recommendation.

## Identification of Goals and Recommendations (Continued)

At the sixth Healthy Watershed Meeting, the overarching goals were reviewed for acceptance, and where edits were suggested by attendees, the verbiage of the overarching goals were edited until the overarching goal was found to be acceptable by the group. Under each overarching goal, each specific recommendation was reviewed to clarify the meaning of the recommendation. Where a specific recommendation was found to be unacceptable to the group, this recommendation was removed from the list. The remaining recommendations were voted on by the group using Turning Point software and voting devices. Sixteen attendees of the sixth meeting chose to participate in the voting process. If an attendee felt that it was not appropriate for themselves to vote on a particular recommendation list, the attendee(s) abstained from voting on that list.

For each recommendation list, the voting was set up to receive the top three choices from each voter. The first vote from each receiver was weighted 10 points, the second vote from each receiver was weighted 9 points, and the third vote from each receiver was weighted 8 points. This weighting is the default setting for priority ranking questions using Turning Point software.

At the end of the sixth meeting, the attendees were asked (using Turning Point software) if the North Fork Salt River Watershed should continue to have a local advisory committee. Twelve attendees voted on this question. The attendees were then asked (again with Turning Point) how often a local committee should meet in the future, and nine attendees voted on this question. For these two questions, only one top choice was accepted by the voting software.

## Goals and Recommendations for Guiding Principles

**Guiding Principles** – The guiding principles and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. **Where there was a tie, those recommendations have equal rank (\*).** The percentage of the voting points received for each recommendation is listed in the parentheses after the recommendation.

### 1. Agriculture Sustainability

Overarching Goal: Keep agriculture a vibrant business in the watershed by keeping agriculture economically, financially, and biologically sustainable – even for small and marginal farmers and to keep the land, livestock, and crops efficient and sustainable in order to maintain the food supply for our future generations and maintain the competitiveness of U.S. agriculture in global markets.

Recommendations for this Goal:

1. Promotion of crop rotation and use of cover crops (21.4%)
2. Analyze best management practices for profitability (18.0%)
- 3\*. Not support regulations that make farming less profitable; support cost/benefit analysis of all proposed regulations and programs (17.8%)
- 3\*. Maintain flexibility in implementation of best practices (17.8%)
4. Education on how to keep applied fertilizers from entering the water supply (16.6%)
5. Improve soils so less inputs are required (8.4%)

# North Fork Salt River Watershed

## Healthy Watershed Plan

### Guiding Principles

Because the guiding principles developed by the group will be the foundation for guiding activities to address issues in the watershed, the goals and recommendations for the guiding principles will be presented first.

The guiding principles and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. Where there was a tie, those recommendations have equal rank (\*). The percentage of the voting points received for each recommendation is listed in the parentheses after the recommendation.

## Goals and Recommendations for Guiding Principles (Continued)

### 2. Property Rights

Overarching Goal: Maintain property rights of landowners in the watershed to strike a balance between owner independence and public community “good”.

Recommendations for this Goal:

1. Oppose unfunded mandates – any regulation that mandates expenditures for management changes by landowners for benefits of others must be fully funded, in expeditious fashion, by society at large (35.6%)
2. Oppose regulations and assessments of private properties (33.1%)
3. Have a non-inflammatory, non-confrontational approach to good environmental goals (31.3%)

### 3. Water Quality

Overarching Goal: Maintain and improve water quality in the watershed to be clean by promoting best management practices throughout the watershed.

Recommendations for this Goal:

1. Use best management practices in urban and rural settings to improve raw water quality

### 4. Education/Outreach/Continued Education and Data Collection

Overarching Goal: Provide education based on science (i.e. data collection) and respectfully inform stakeholders, landowners, and operators in the watershed about the important issues facing the watershed and offer flexible, sustainable, measurable solutions/best practices so that people in the watershed have knowledge of conservation.

Recommendations for this Goal:

1. Support more hands-on seminars, field days, and demo plots on conservation practices that benefit the watershed (30.4%)
2. Support educators who can present balanced information (22.8%)
3. Support use of multiple venues/media – radio, newspaper, TV, social media, websites, Facebook, Twitter, and technology to provide information to stakeholders. (21.8%)
4. Support data collection and analysis that is kept current and analyze data to show the cost/benefit to the public (18.0%)
5. Support Stream Teams in the watershed (7%)

# North Fork Salt River Watershed

## Healthy Watershed Plan

### Guiding Principles

Because the guiding principles developed by the group will be the foundation for guiding activities to address issues in the watershed, the goals and recommendations for the guiding principles will be presented first.

The guiding principles and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. Where there was a tie, those recommendations have equal rank (\*). The percentage of the voting points received for each recommendation is listed in the parentheses after the recommendation.

## Goals and Recommendations for Guiding Principles (Continued)

### 5. Local Input

Overarching Goal: Promote effective voluntary watershed management through local input to avoid federal control of the watershed and avoid intrusion from outside entities. Be consistent with overarching laws as well as local goals.

Recommendations for this Goal:

1. Hold stakeholder meetings/town hall meetings and talk to neighbors (26.8%)
2. Effectively manage "issues" at the local level (26.3%)
3. Support local groups that address watershed issues (24.3%)
4. Create enthusiasm for improving quality of clean waters by getting kids and individuals involved and making information interesting and fun to all persons (22.6%)

### 6. Fish and Wildlife

Overarching Goal: Keep area streams and wetlands as viable habitats for fish and other wildlife.

Recommendations for this Goal:

1. Promote Best Management Practices (30.8%)
2. Create more landowner friendly conservation plans – talk to landowners about why current programs are not used (22.3%)
3. Support prevention of spread of non-natives and invasive species (20.5%)
4. Maintain a variety of habitats (19.5%)
5. Expand MDC program to lease private land for public recreation opportunities (6.9%)

### 7. Basin Flow Management

Overarching Goal: Educate the public with best management practices to improve infiltration and reduce volume of runoff from the watershed.

Recommendations for this Goal:

1. Continue with trials and experiments to learn better practices and have more seminars/meetings to share results of trials and experiments

# North Fork Salt River Watershed

## Healthy Watershed Plan

### Issues

The issues and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. Where there was a tie, those recommendations have equal rank (\*).

## Goals and Recommendations for Issues

**Issues:** The issues and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. **Where there was a tie, those recommendations have equal rank (\*).**

### 1. Flooding/Rate/Volume of Water:

Overarching Goal: Reduce soil and stream bank erosion and reduce damages to homes and other infrastructure due to flooding.

Recommendations for this Goal

1. Improving infiltration of all crop and pastureland through soil health practices including no-till, cover crops, better crop rotations, strip cropping, strip tilling and rotational grazing (27.2%)
2. Terraces, retention/detention basins, and diversion structures to slow down water and divert water from concentrated areas. (26.7%)
3. Control runoff from development (housing, roads, etc.) through urban stormwater detention. (23.5%)
4. Filter strips and riparian buffer strips along streams and waterways to slow water down. (22.6%)

### 2. Funding – Source and Uses

Overarching Goal: Increase funding in the watershed, including funding for small communities, to improve watershed quality and fund the installation and maintenance of best management practices.

Recommendations for this Goal:

1. Educate the public on watershed issues (30.6%)
- 2\*. Provide more cost-share opportunities (19.9%)
- 2\*. Educate landowners on funding opportunities and resources and make “the system” easier to navigate (19.9%)
3. Identify an individual/entity to maintain knowledge of funding sources and provide grant writing expertise. (9.6%)
- 4\*. Get stakeholder input and provide information to everyone who will listen (8.6%)
- 4\*. Apply for grant/USDA loan programs (8.6%)
5. Participate in MPUA (MO Public Utility Alliance) (2.7%)
- 6\*. Talk to legislators/get legislators involved (no votes)
- 6\*. Funding agencies should coordinate with each other (no votes)

# North Fork Salt River Watershed

## Healthy Watershed Plan

### Issues

The issues and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. Where there was a tie, those recommendations have equal rank (\*).

## Goals and Recommendations for Issues (Continued)

### 3.) Education and Outreach

Overarching Goal: Reach all decision makers and influencers involved in farm practice decision making, young farmers and students interested in farming, schools and communities with best management practices and opportunities to network to address any issues in the watershed for the present and future. Increase public knowledge of the water cycle, understanding of problems and solutions, and public support for safe drinking water.

Recommendations for this Goal:

1. Have a public education campaign and advertise publically in schools and community town meetings (28.1%)
2. Teach in schools the connection between wastewater, surface water, and drinking water (27.3%)
3. Develop awareness of water quality standards and water contamination (25.1%)
4. Organize annual public clean-up days and have communities and counties help. (14.9%)
5. Public service announcements and newspaper articles (4.7%)

### 4. Sediments/Turbidity

Overarching Goal: Reduce the sediment load from the watershed by slowing down runoff to reduce soil erosion.

Recommendations for this Goal:

1. Soil conservation measures such as no-till/ low till, cover crops, crop rotations, and leaving more crop residue on top of the ground (28.1%)
2. Control water runoff with dry hole structures, ponds, and terraces (23.4%)
3. Filter strips, grass buffers, and riparian buffers (22.9%)
4. Fund more terracing programs (13.1%)
5. Monitor/correct ditch erosion (8.3%)
- 6\*. Reduce impermeable surfaces (2.1%)
- 6\*. Stabilize stream banks and lake banks (2.1%)
7. Underground drainage (no votes)

### 5. Nutrients

Overarching Goal: Increase the use of practices that keep nutrients in place and better utilize the timing of nutrient applications so that nutrient runoff is reduced from the watershed.

Recommendations for this Goal:

1. Education about timing and amounts of fertilizer applications to apply at the right rate and right time (27.7%)
2. Grid soil sampling and precision application technology for more exact fertilizer use (26.3%)
3. Use cover crops to scavenge nutrients (18.3%)
4. Reduce soil erosion to reduce nutrient runoff (15.4%)
5. Crop rotations (12.3%)

# North Fork Salt River Watershed

Healthy Watershed Plan

## Issues

The issues and their associated recommendations are listed in the order of priority in which they were ranked by the local advisory group. Where there was a tie, those recommendations have equal rank (\*).

## Contact Information for this Watershed

Missouri Department of Natural Resources  
Northeast Region  
Watershed Coordinator  
1709 Prospect Drive  
Macon, MO 63552  
660-385-8000

Or visit the Web at  
[dnr.mo.gov/omw](http://dnr.mo.gov/omw)

## Goals and Recommendations for Issues (Continued)

### 6. *E. coli*

Overarching Goal: Reduce and minimize the amount of *E.coli* in the water.

Recommendations for this Goal:

1. Minimize and prevent lagoon and wastewater spills and overflows (38.7%)
2. Promote managed grazing (32.1%)
3. Provide alternative drinking for livestock and fencing for livestock exclusion (29.1%)

## For Additional Information

If you would like additional information regarding this document, please contact the Mark Twain

Regional Council of Governments at (573) 565-2203 or the Department of Natural Resources at (660) 835-8000.

All minutes and presentations from the planning process can be found online at <http://>

[www.marktwaincog.com/programs/missouri-waters/north-fork-salt-river-watershed/](http://www.marktwaincog.com/programs/missouri-waters/north-fork-salt-river-watershed/)

