# MARAIS DES CYGNES BASIN TOTAL MAXIMUM DAILY LOAD

## Waterbody / Assessment Unit (AU): Salt Creek Watershed
## Water Quality Impairment: Atrazine

## 1. INTRODUCTION AND PROBLEM IDENTIFICATION

**Subbasin**: Upper Marais des Cygnes **Counties**: Lyon, Osage

**HUC8**: 10290101 **HUC10** (12): 1029010103(05, 06)

**Ecoregion**: Central Irregular Plains, Osage Cuestas (40b)

**Drainage Area**: Approximately 110 Square Miles

**Water Quality Limited Segments**:

| ***Main Stem*** | ***Tributaries*** |
|---|---|
| Salt Creek (29) | Mute Creek (92) |
| | Jersey Creek (76) |

**Designated Uses**: Salt Creek (29) is designated for expected aquatic life; Primary Contact Recreation Class C; Drinking Water Supply; Food Procurement; Groundwater Recharge; Industrial Use; Irrigation Watering Use; and Livestock Watering Use.

Mute Cr (92) is designated for expected aquatic life; secondary contact recreation class b; irrigation watering use; and livestock watering use.

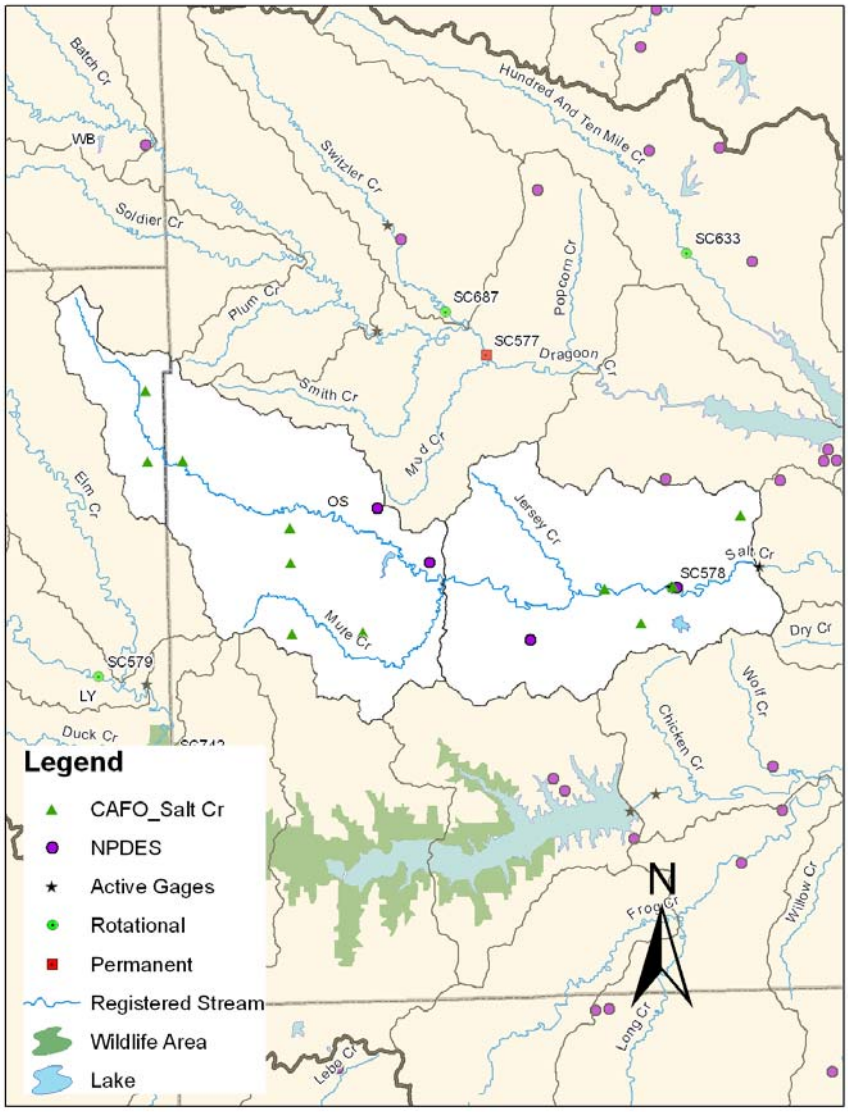
Jersey Cr (76) is designated for expected aquatic life; secondary contact recreation class b; and food procurement.

**303(d) Listings**: Kansas stream segments monitored by Station SC578, Salt Creek, cited as impaired by Atrazine in the 2002, 2004, 2008, 2010, and 2012 303(d) lists.

**Impaired Use**: Chronic Aquatic Life Support

**Water Quality Criteria**: Domestic Water supply – Atrazine 3 µg/l (ppb) (annual average, not impaired) (K.A.R. 28-16-28e(c)(3)(A))
Aquatic Life Support – Atrazine Chronic: 3 µg/l (ppb) (impaired)
Aquatic Life Support – Atrazine Acute: 170 µg/l (ppb) (Not Impaired)
(K.A.R. 28-16-28e(c)(2)(D)(ii)) & (Table 1a; K.A.R. 28-16-28e(d))

**Figure 1**. Salt Creek watershed basemap.




## 2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

**Level of Support for Designated Uses under 2012-303(d):** Not supporting Aquatic Life.

**Stream Monitoring Site and Period of Record**: Active KDHE rotational ambient stream chemistry sampling station SC578 located on Salt Creek near Lyndon. Sampled during the years of 1990, 1994, 1998, 1999, 2000, 2002, 2006, and 2010.

**Flow Record**: USGS gage 06911490 on Salt Creek at Lyndon (1999-2012) and USGS Gage 06911500 on Salt Creek near Lyndon (1988-1999) were utilized to establish flow conditions in the watershed. The USGS gage 06911490 is located at the same location of the KDHE sampling station. For samples collected prior to the use of this gage (prior to October of 1999) the flow values for each sampling date are based on USGS gage 06911500, which is just downstream of the sampling point a few stream miles.

**Table 1**. Long term flow conditions as calculated from USGS flow data from USGS Gages 06911490 and 06911500.

| Stream | Avg. Flow (cfs) | Percent of Flow Exceedance | | | |
|---|---|---|---|---|---|
| | | 75% | 50% | 25% | 10% |
| Salt Creek at Lyndon (USGS Gage 06911490) | 58 | 1.2 | 5.8 | 22.0 | 77.0 |
| Salt Creek near Lyndon (USGS Gage 06911500) | 75.3 | 0.72 | 4.5 | 27 | 104.7 |
| Salt Creek Combined Flow from USGS gages 06911490 and 06911500 (1988-2012) | 66.1 | 0.9 | 5.3 | 24.0 | 92.0 |

**Precipitation**: The average annual rainfall in the watershed is approximately 39.5 inches/year.

**Current Condition**: This TMDL applies to the chronic aquatic life criterion for atrazine. Data associated with the sampling stations within the watershed have been divided into two categories, the runoff period and the non-runoff period. The runoff period includes the months of April, May, June , and July where runoff and atrazine applications are likely to occur. These months are associated with the time period atrazine is applied for herbicide control and is also susceptible to being washed off of the target fields if precipitation occurs and creates a runoff event. The non-runoff period accounts for months outside of the runoff season when the use of atrazine is typically not occurring and rainfall events are less intense, hence atrazine will not runoff of the fields during these months. Other than the month of August, there is no atrazine impairment during the nonrunoff period.

Atrazine concentrations in the watershed average 4.87 ug/L during the runoff period at SC578. The months of June and July have the highest average atrazine concentration of 10.15 ug/l and 5.15 ug/l respectively, as seen in Figure 2 and Table 2. As seen in Table

2, the months of May and July have the fewest samples collected over the period of record. Figure 2 details each individual sample collected during the period of record by month. There are no samples over the water quality standard during the nonrunoff period in any month other than August. Of the the months with observed atrazine violations, June and August were sampled the most often . As seen in Table 3 and Figure 3, the years of 1999 and 2000 were sampled more than any other sampling year. Samples were collected monthly during these two years, which indicates this station was programmatically selected for more intensive sampling for these two years. According to the regular schedule for rotational sampling stations, SC578 is a rotational station that is sampled on a quarterly bases every fourth year. The regularly scheduled rotational sampling years include 1990, 1994, 1998, 2002, 2006, and 2010. There has not been any atrazine violations at SC578 since July of 2000. For the past three sampling years there have only been five samples collected during the runoff season. Since KDHE sampling occurs without consideration of rainfall or atrazine application dates, the frequency and magnitude of elevated atrazine levels within the watershed may be missed when sampling dates are limited.

**Table 2**. Monthly summary of atrazine samples and average concentrations at SC578.

| Month | # of Samples | # of Samples > 3 ug/L | Monthly Atrazine Average in ug/L |
|---|---|---|---|
| January | 2 | 0 | 0.3 |
| February | 3 | 0 | 0.36 |
| March | 3 | 0 | 0.3 |
| April | 5 | **1** | 2.2 |
| May | 2 | 0 | 0.7 |
| June | 4 | **3** | **10.15** |
| July | 2 | **1** | **5.15** |
| August | 5 | **2** | **3.2** |
| September | 2 | 0 | 1.3 |
| October | 3 | 0 | 0.6 |
| November | 2 | 0 | 1.0 |
| December | 5 | 0 | 0.52 |

**Table 3.** Summary of atrazine samples for each sampling year.

| Sampling Year | # of Samples | Atrazine Average (ug/L) | # of Runoff Season Samples | Runoff Period Atz Avg (ug/L) | # of Samples > 3 ug/L |
|---|---|---|---|---|---|
| 1990 | 1 | 1.2 | 0 | - | 0 |
| 1994 | 3 | 2.57 | 1 | 0.3 | 1 |
| 1998 | 3 | 2.67 | 1 | 7.4 | 1 |
| 1999 | 12 | 2.83 | 4 | 6.6 | 3 |
| 2000 | 9 | 3.61 | 4 | 6.85 | 2 |
| 2002 | 3 | 0.87 | 1 | 0.3 | 0 |
| 2006 | 3 | 0.72 | 1 | 0.36 | 0 |
| 2010 | 4 | 0.67 | 1 | 1.2 | 0 |

**Figure 2**. Atrazine samples at SC578 relative to the sampling month.

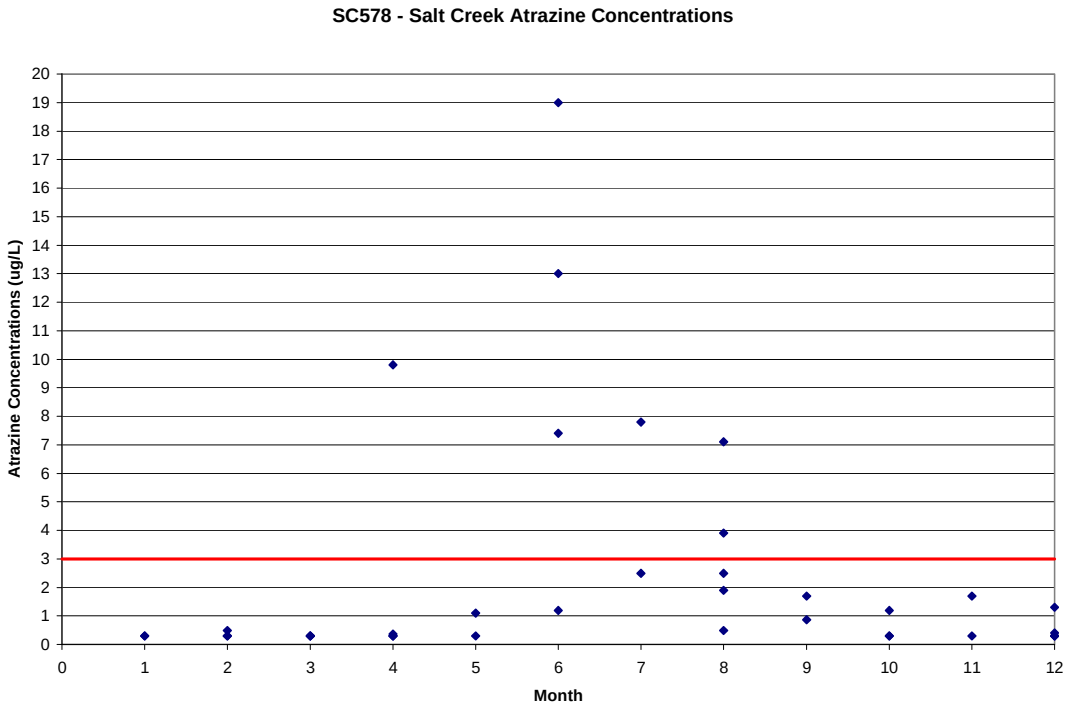



**Figure 3**. Atrazine Concentrations relative to sampling year

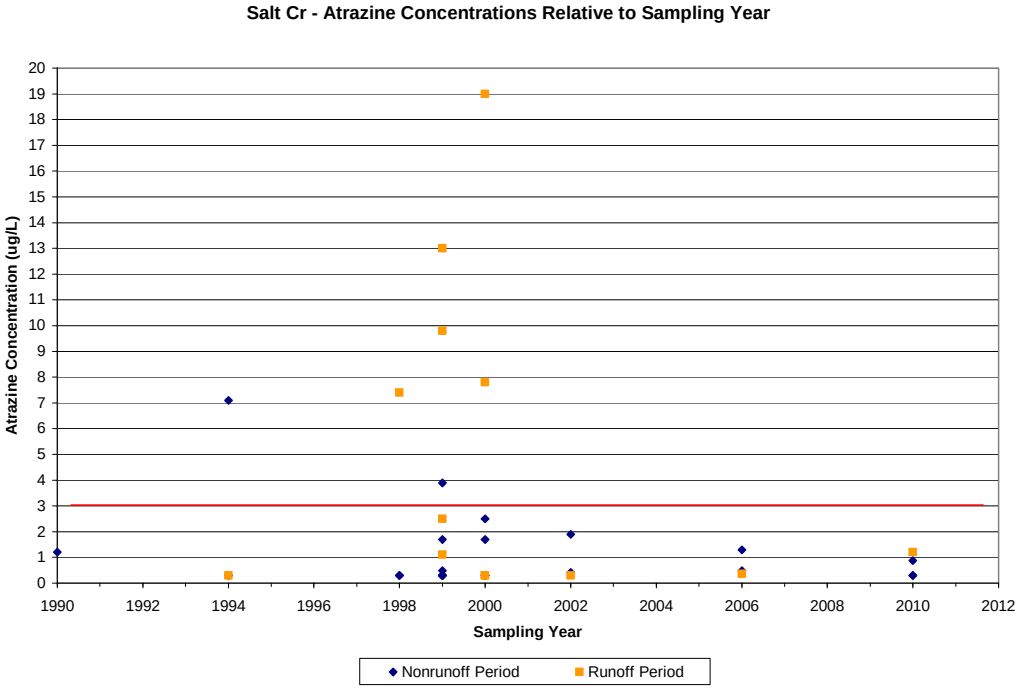
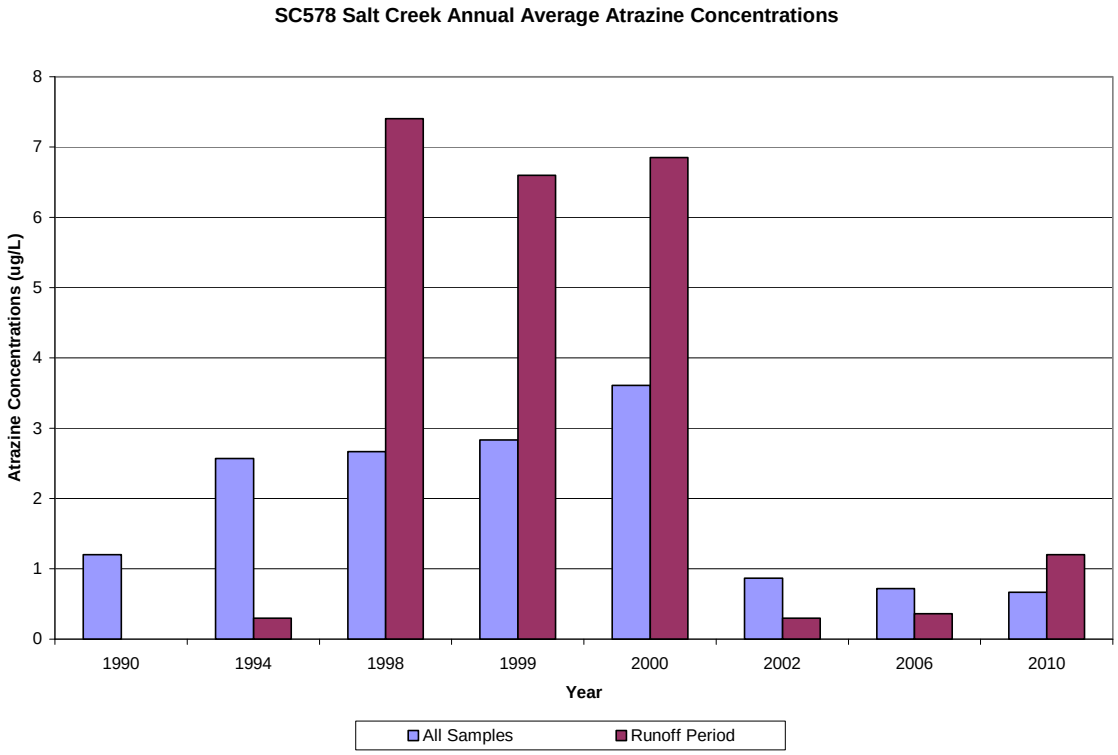


**Figure 4**. Annual atrazine concentration averages.




As seen in Figure 4 and Table 3, atrazine concentration averages during the runoff period were the greatest during the sampling years of 1998, 1999, and 2000. There was only one sample collected during the 1998 sampling runoff period and there were four samples collected during this same period in both 1999 and 2000.

Streamflows increase substantially from February through May, where higher average streamflows are maintained through July. Monthly rainfall averages tend to have a similar pattern as the average streamflow within the watershed. Atrazine applications are typically the highest during the months of May and June. Atrazine applications that are trailed by rainfall and runoff events lead to the transport of atrazine off the target fields and into the streams.

**Figure 5**. Monthly average streamflow and rainfall at SC578.

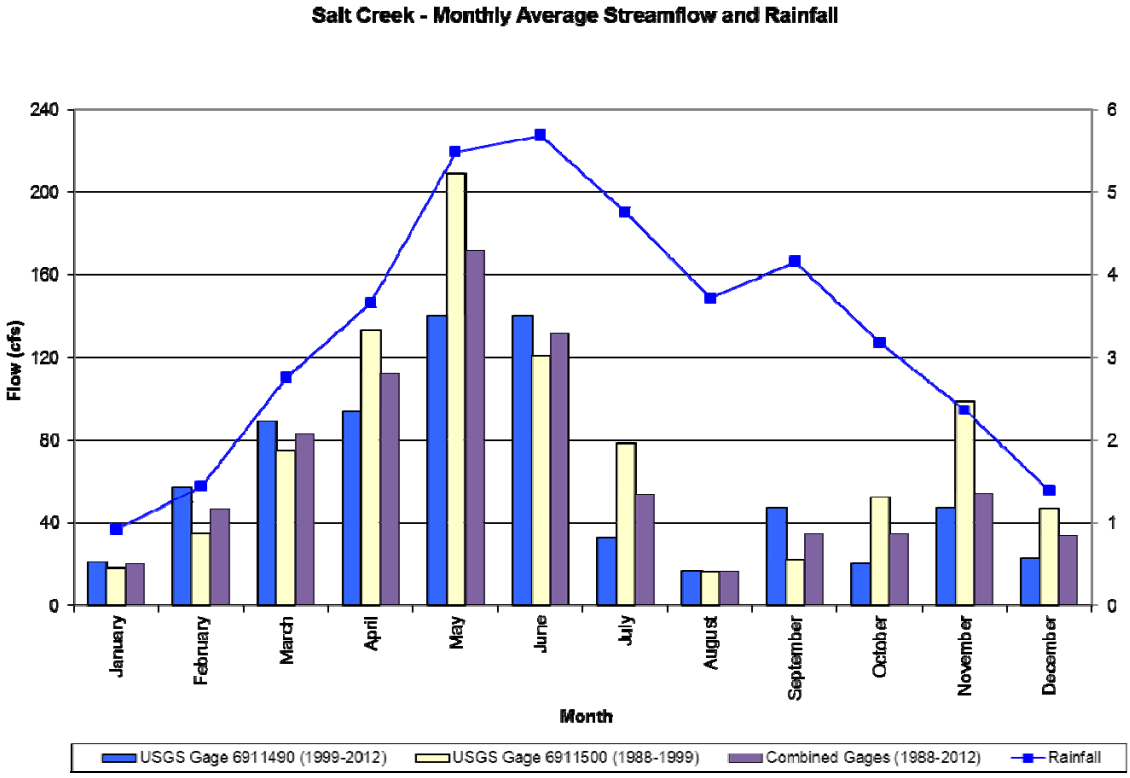



Figure 6 details the atrazine concentration relative to the percent of flow exceedance in the watershed. The flow data associated with all samples that exceeded 3 µg/l indicate runoff events of varying magnitude occurred within the 14 days prior of the sampling date. Brief rainfall events are capable of transporting recently applied atrazine from the target crops and into the streams in the watershed. A summary of the flow conditions for the seven atrazine samples that exceeded the standard at SC578 are detailed in Table 4. During the lower flow conditions when flows are less than median flows (<5.3 cfs) and atrazine was detected, it is apparent that flow conditions were unstable, indicating one or more brief storm events transported atrazine in the watershed. As seen in Figure 7, the flow conditions prior to the exceedance on July 13, 2000, indicates a brief runoff event 11 days prior to the sampling date and another event that was likely occurring during the sampling date as seen with the increase in flow on the sampling date. The atrazine violations observed in August of 1994 and 1999 are likely associated with the runoff of atrazine applied in June or July. Flow data from 1994 suggests dry conditions throughout much of July with a late July runoff event. Flow data from 1999 indicates a large runoff event 5 days prior to the sampling date after dry conditions in July.

**Table 4**. Summary of flow conditions for atrazine violations in Salt Creek at SC578.

| Sampling Date | Atrazine Concentration µg/L | Flow on Sampling Date (cfs) | Maximum Flow within 14 days of sampling date (cfs) (# of days prior to sampling event) | Minimum Flow within 14 days of sampling date (cfs) |
|---|---|---|---|---|
| 8/3/1994 | 7.1 | 0.61 | 17 (14 days) | 0.42 |
| 6/10/1998 | 7.4 | 2.1 | 7.8 (6 days) | 2.1 |
| 4/15/1999 | 9.8 | 2570 | 2570 (0 days) | 10 |
| 6/10/1999 | 13 | 14 | 116 (8 days) | 14 |
| 8/12/1999 | 3.9 | 2.2 | 373 (5 days) | 2.2 |
| 6/15/2000 | 19 | 6.7 | 47 (1 day) | 0.7 |
| 7/13/2000 | 7.8 | 1 | 3.2 (11 days) | 0.24 |

**Figure 6**. Atrazine concentrations relative to percent of flow exceedance in Salt Creek.

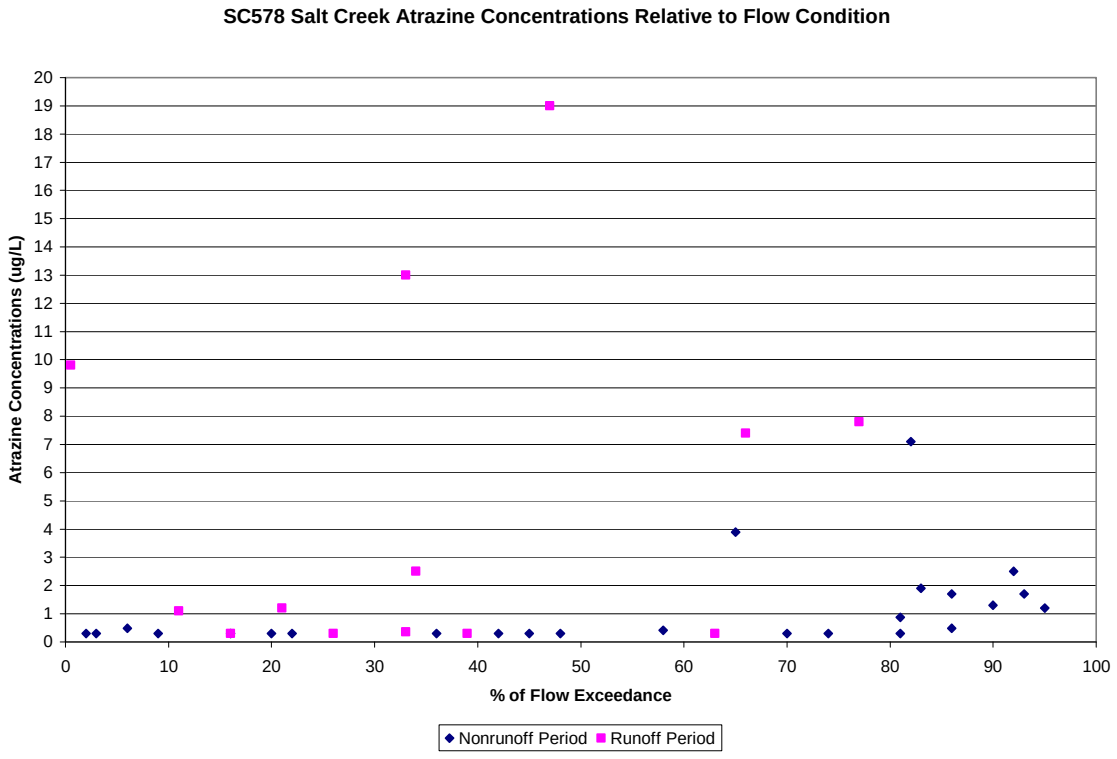
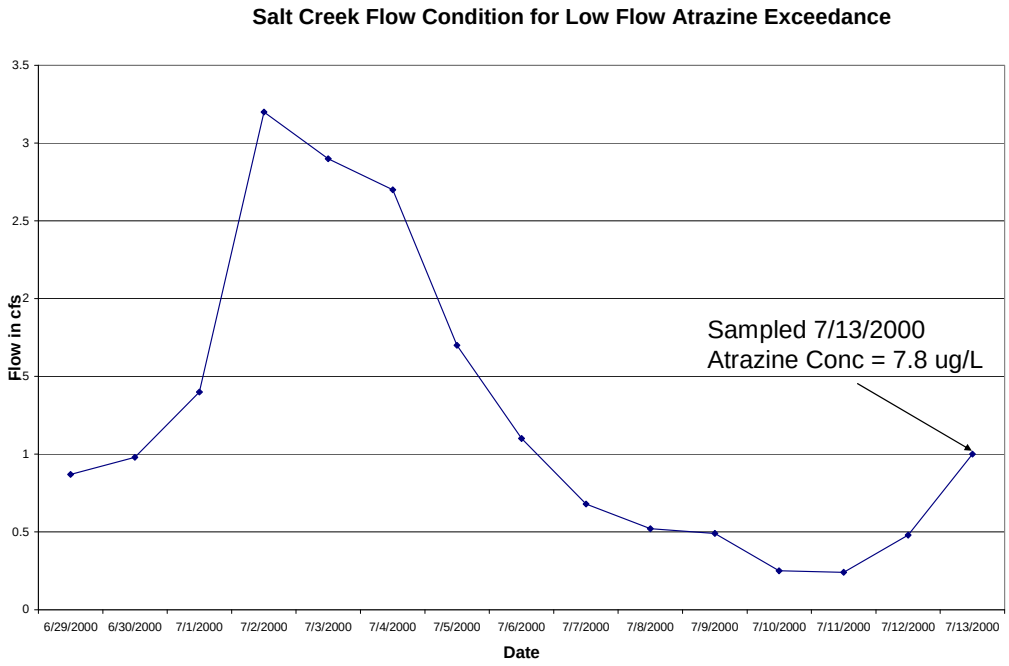


**Figure 7**. Flow profile leading up to atrazine violation sampled on 7/13/2000.




**Desired Endpoints of Water Quality (Implied Load Capacity for Atrazine) in Salt Creek**:

The ultimate endpoint for this TMDL will be to achieve the Kansas Water Quality Standards fully supporting chronic aquatic life support . The current standard of 3 µg/L for atrazine was utilized to establish the TMDL. Seasonal variation has been incorporated in this TMDL through the documentation of the seasonal (April-July) occurrence of elevated atrazine levels.

The following endpoints will define achievement of the water quality standards.

1. Average monthly atrazine exceedances over 3 µg/l will not occur in Salt Creek or the streams within the Salt Creek watershed.
2. No individual sample of atrazine will exceed 170 µg/l.
3. Overall annual concentrations will average below 3 µg/l at SC578

The following milestones will establish the baseline of current water quality conditions to assess interim progress in the watershed.

1. There will be no atrazine digressions over 3 µg/l in Salt Creek in any month other than June or July.
2. There will be no digression of atrazine over 3 µg/l in streams throughout the watershed during flows less than the long term mean daily flow on Salt Creek.

## 3. SOURCE INVENTORY AND ASSESSMENT

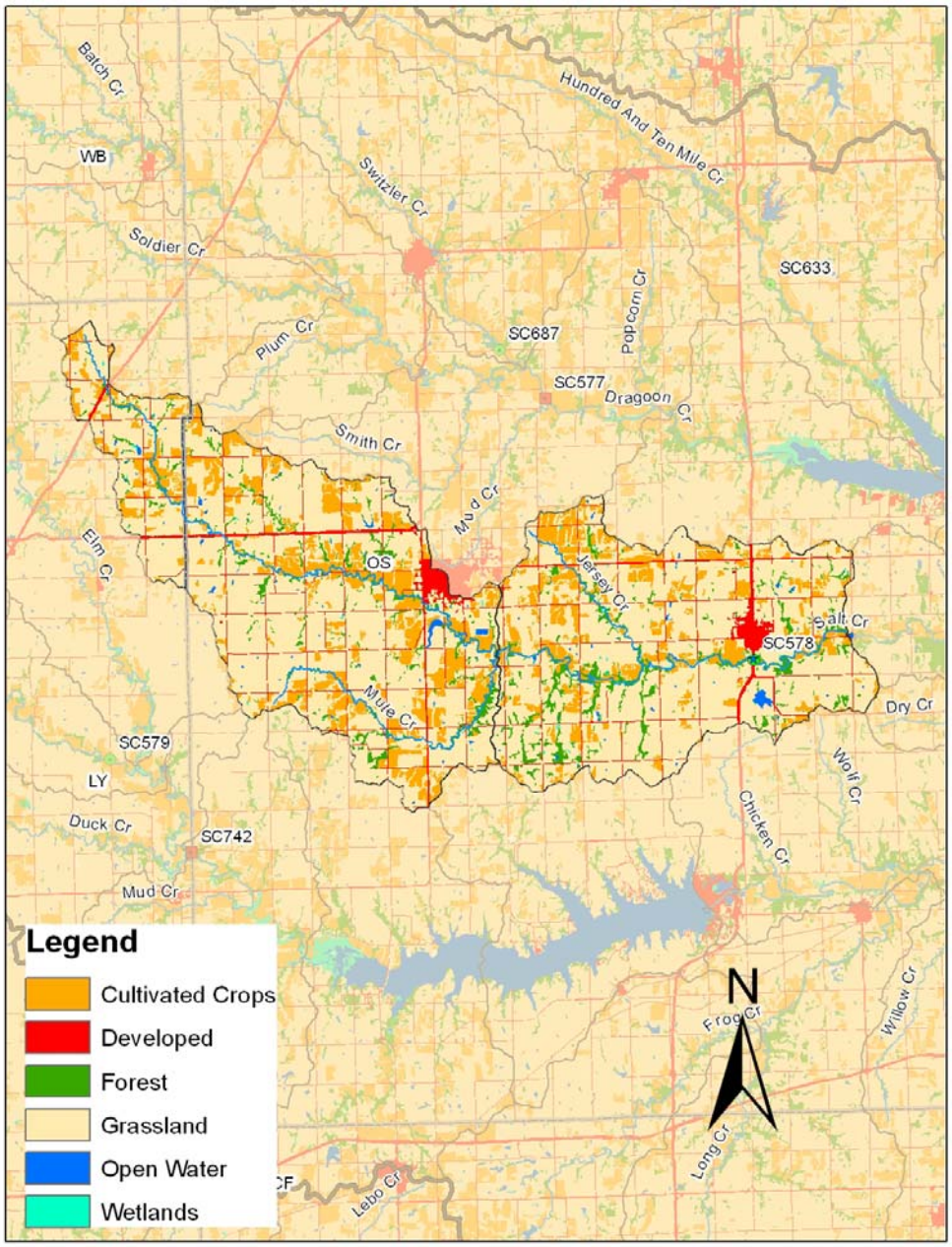
The primary source of atrazine entering the Salt Creek watershed is attributed to the application of atrazine prior to rainfall events that lead to overland runoff of cropland during the months of April, May, June, and July. Atrazine has been widely utilized since the 1960's for selective control of broadleaf and grass weeds in corn and grain sorghum. There is an economic value associated with the application of atrazine to specific crops. However, atrazine is highly soluble in water and is susceptible to removal from cropland during overland runoff events, which impacts water quality. The actual timing of atrazine application in each subwatershed, the localized rainfall over each stream, the slope and soil conditions in each subwatershed and the impact of any pesticide Best Management Practice utilized by individual farmers complicates the true relation between rain and atrazine loading.

**Land Use**: The land cover in the Salt Creek watershed is dominantly grassland and cropland. Table 5 further details the percentages of all landuse acres in the watershed. As seen in Figure 8, cropland is the predominant land cover lying along the main segments of Salt Creek.

**Table 5**. Landuse acreage in the Salt Creek Watershed.

| Landuse | Acres | Percent of Watershed |
|---|---|---|
| Grassland/Pasture | 48309 | 68.90 |
| Cultivated Crops | 13138 | 18.74 |
| Forest | 4126 | 5.88 |
| Developed | 3944 | 5.63 |
| Open Water | 433 | 0.62 |
| Wetlands | 164 | 0.23 |

**Figure 8**. Landuse map for Salt Creek watershed.




**Point Sources**: There are four NPDES facilities located within the Salt Creek watershed (see Appendix A). Since atrazine is associated with agricultural nonpoint source pollution, point sources are not a source of impairment under this TMDL.

**Contributing Runoff**: The watershed of Salt Creek has a mean soil permeability value of 0.41 inches/hour, ranging from 0.01 to 1.29 inches/hour according to the NRCS STATSGO database. According to a USGS open-file report (Juracek, 2000), the

threshold soil-permeability values that represents very high, high, moderate, low, very low, and extremely low rainfall intensity, were set at 3.43, 2.86, 2.29, 1.71, 1.14, and 0.57"/hour, respectively. The lower rainfall intensities generally occur more frequently than the higher rainfall intensities. The higher soil-permeability thresholds imply a more intense storm during which areas with higher soil permeability potentially may contribute runoff. Runoff is chiefly generated as infiltration excess with rainfall intensities greater than the soil permeability. As soil profiles become saturated, excess overland flow is produced. For the Salt Creek watershed, runoff will be produced by a rainfall event producing 1.14 inches/hour rain in approximately 61% of the watershed, and a rainfall event producing 1.29 inches/hour of rain will produce runoff over the entire watershed based on the soil permeability values in the watershed. Cropland runoff attributes to the atrazine impairment within the watershed.

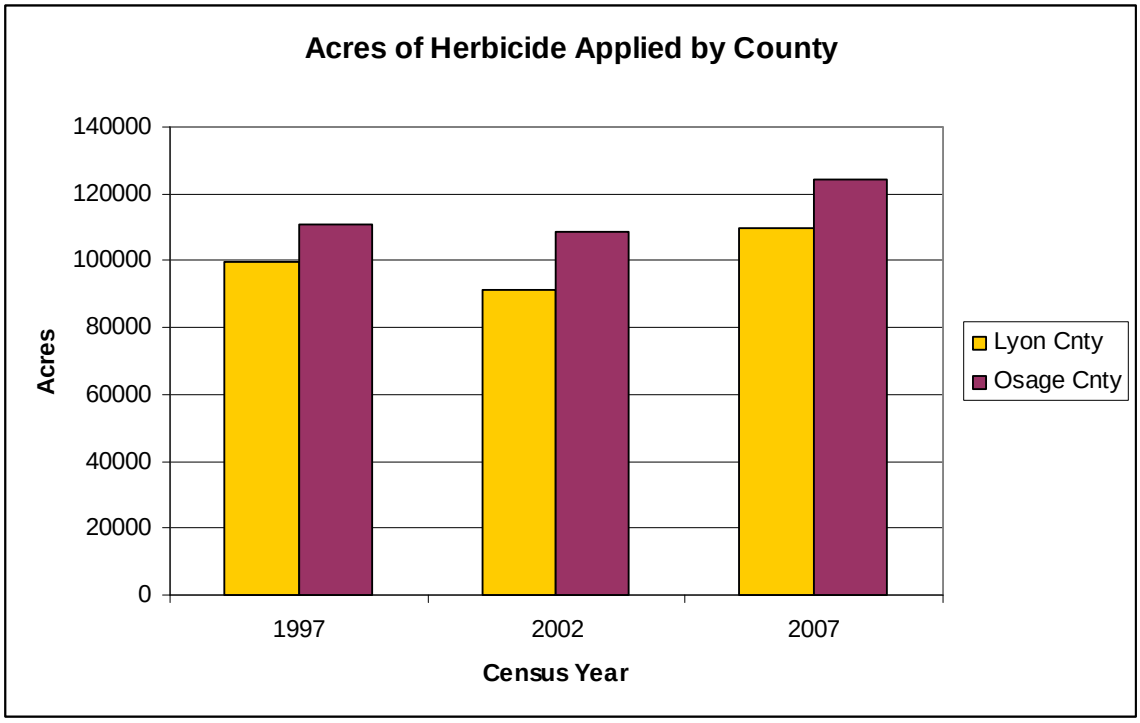
**Livestock Waste Management Systems**: There are eleven certified or permitted confined animal feeding operations (CAFOs) within the Salt Creek watershed (see Appendix B). These facilities are designed to retain a 25-year, 24-hour rainfall/runoff event as well as an anticipated two weeks of normal wastewater from their operations. Typically, this rainfall event coincides with streamflow that occurs less than 1-5% of the time. Though the total potential number of animals is approximately 4,070 head in the watershed, the actual number of animals at the feedlot operations is typically less than the allowable permitted number. According to the Kansas Agricultural Statistics, as of January 1, 2011 the estimated number of all cattle and cows for Lyon and Osage counties are 65,000 and 34,000 respectively. Livestock facilities do not contribute to the atrazine impairment within the watershed.

**County Agricultural Statistics**: According to the United States Department of Agriculture Statistics Service and as seen in Figure 9, herbicides are reported to have been applied to 110,028 acres and 124,337 acres in Lyon and Osage Counties respectively during 2007. As seen in Table 6, the majority of the row crop acres planted in the watershed include soybeans and corn. Soybeans account for 71% and 65% of the planted row crop acres in Lyon and Osage counties respectively. The acres planted in corn have steadily increased over the past five years and account for 26% and 30% of the planted row crop acres in Lyon and Osage counties respectively. Based on the acres of herbicides applied compared to the acres of row crops within these counties, herbicides are likely applied to all of the row crops within the watershed. Atrazine applications are specific to corn and sorghum, however soybean stubble may be subject to atrazine application if corn or sorghum are to be planted the following spring.

**Table 6**. Kansas Farm Facts for Osage and Lyon Counties.

| Year | Lyon County | | | Osage County | | |
|---|---|---|---|---|---|---|
| | Corn Acres Planted | Sorghum Acres Planted | Soybean Acres Planted | Corn Acres Planted | Sorghum Acres Planted | Soybean Acres Planted |
| 2004 | 24,500 | 6400 | 61,200 | 24,900 | 9700 | 55,800 |
| 2005 | 26,200 | 5500 | 70,900 | 29,900 | 9200 | 66,600 |
| 2006 | 22,300 | 3000 | 74,700 | 25,000 | 6000 | 71,800 |
| 2007 | 24,000 | 3900 | 66,100 | 28,300 | 6700 | 59,800 |
| 2008 | 24,800 | 3600 | 67,200 | 29,500 | 5700 | 64,200 |
| 2009 | 26,000 | 2300 | 76,000 | 31,500 | | 70,500 |
| 2010 | 30,500 | 1400 | 84,000 | 39,000 | 1700 | 73,000 |
| 2011 | 32,000 | 1700 | 80,000 | 40,000 | 1500 | 71,000 |

**Figure 9**. Herbicides applied to Lyon and Osage Counties (Kansas Agricultural Statistics).




**On-site Waste Systems**: Households outside of the City of Lyndon and Osage City are presumably utilizing on-site septic systems. The Spreadsheet Tool for Estimating Pollutant Load (STEPL) was utilized to identify the number of septic systems within the HUC12s within the watershed. According to STEPL, there are approximately 389 septic systems within the Salt Creek watershed with an anticipated failure rate of 0.93%. On-site septic systems are not a source contributing to the atrazine impairment within the watershed.

## 4. ALLOCATION OF POLLUTION REDUCTION RESPONSIBILITY

The application and subsequent runoff of atrazine from cropland in the Salt Creek watershed is the primary factor for the elevated amounts of atrazine seen in the watershed.

**Point Sources**: Since this pollutant is associated with agricultural nonpoint source pollution, a Wasteload Allocation of zero will be assigned to point sources for atrazine under this TMDL.

**Nonpoint Sources**: All load allocations will be assigned to station SC578 on Salt Creek. The TMDL and load allocations are based on a load duration curve approach as seen in Figure 10. Table 7 details the atrazine TMDL based on the monthly average streamflows over the period of record and compares these against the crrent monthly average atrazine concentrations and loads during the specified months. The months of June, July, and August require reductions within the period for stations SC578. The estimated necessary average load reduction for the combined June to July period is 64.6% at station SC578.

Table 8 details the TMDL at the average annual flow condition at SC578 over the period of record, which applies to any given day throughout the year. The Load Allocation at the average flow condition is 1.07 lbs/day at SC578, which is located on the Salt Creek segment 29.

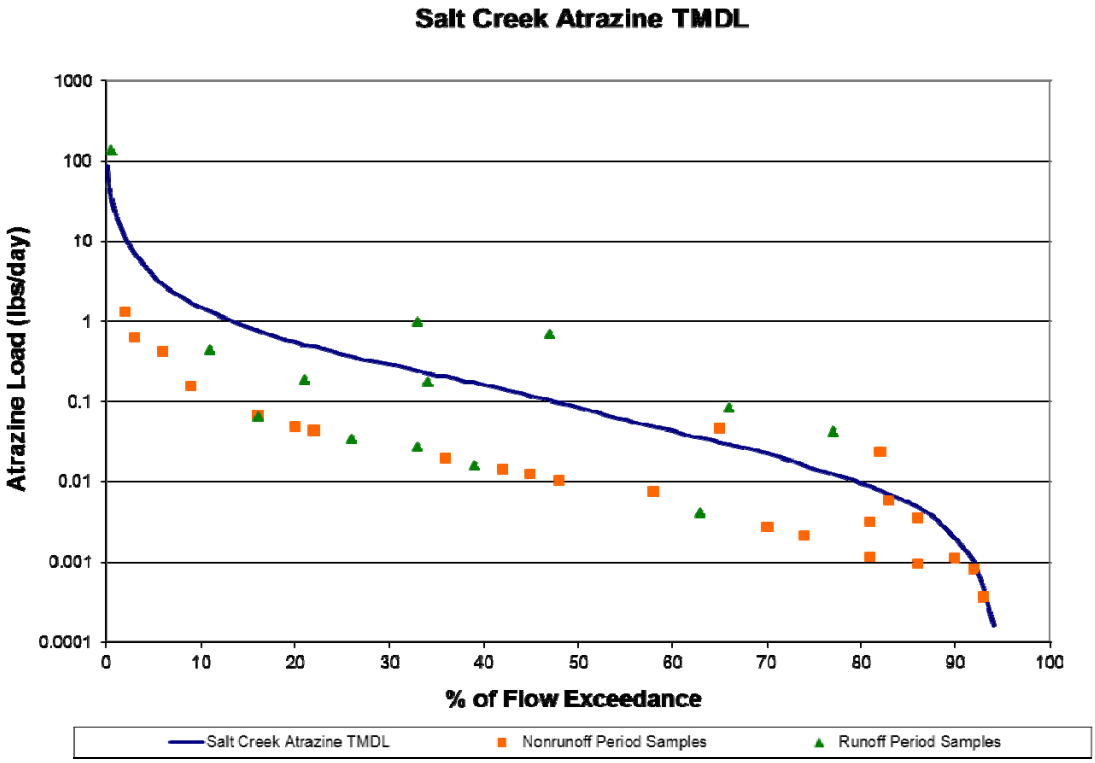
**Table 7**. Current average monthly atrazine loads and necessary reduction to meet the Atrazine TMDL at average flow.

| Month | Atrazine Average (ug/L) | Average Flow (cfs) | Average Load in lbs/day | TMDL (lbs/day) | Load Reduction (%) |
|---|---|---|---|---|---|
| April | 2.2 | 111.9 | 1.33 | 1.81 | 0 |
| May | 0.7 | 171.87 | 0.65 | 2.78 | 0 |
| June | 10.15 | 131.31 | 7.20 | 2.13 | 70.4 |
| July | 5.15 | 53.61 | 1.49 | 0.87 | 41.7 |
| August | 3.2 | 16.69 | 0.29 | 0.27 | 6.25 |
| **June-July** | **8.48** | **91.82** | **4.20** | **1.49** | **64.6** |
| **Annual** | **2.39** | **66.01** | **0.85** | **1.07** | **0** |

**Table 8.** Salt Creek Atrazine TMDL at average flow.

| Station/Segment | Wasteload Allocation (lbs/day) | Load Allocation (lbs/day) | TMDL (lbs/day) |
|---|---|---|---|
| SC578, Salt Creek Segment 29 | 0 | 1.07 | 1.07 |

**Figure 10**. Atrazine TMDL on Salt Creek at SC578.




**Defined Margin of Safety**: The margin of safety is implicit since this TMDL applies to Salt Creek under all flow conditions when the only period that substantiates a TMDL are during the months of June, July, and August. In addition, the TMDL identifies necessary load reductions for the period from June through August when the annual atrazine average requires no load reductions. The flow data has been combined between the two USGS gages in the watershed to calculate the flow and loads in this TMDL and the gages differences in drainage areas and periods of record are an implicit margin of safety utilized to calculate the flow and loads within the watershed.

**State Water Plan Implementation Priority:** The endpoints of this TMDL will likely be achieved if atrazine best management practices are implemented, though there have been no atrazine violations since 2000. Since atrazine concentrations have been compliant with the water quality standard during the past three sampling years in the Salt Creek watershed, this TMDL will be a Low Priority for implementation.

**Unified Watershed Assessment Priority Ranking**: The Salt Creek watershed lies within the Upper Marais des Cygnes Subbasin (HUC8: 10290101) with a priority ranking of 5 (High Priority restoration work).

**Priority Stream segments**: The priority focus should be the implementation within row crop areas adjacent to Salt Creek and its primary tributaries within the watershed.

## 5. IMPLEMENTATION

**Desired Implementation Activities**: The best way to reduce atrazine loading caused by agricultural practices is to ensure that Best Management Practices (BMPs) are being implemented within the watershed. In addition, it is important to educate the agricultural community on atrazine application rates, timing, alternatives, and label instructions. The Kansas State Extension Office has numerous publications available that will assist in the implementation of BMPs throughout the watershed.

1. Implement proper mix of pesticide application best management practices, including: soil incorporation, application timing and rates, split applications, reduced soil-applied rates, post emergence applications, band applications, alternative weed control methods and buffer zones.
2. Implement necessary best management practices at storage and handling sites.
3. Install necessary grass buffer strip along streams.
4. Ensure label compliance by applicators.

**Implementation Programs Guidance**:

**Nonpoint Source Pollution Technical Assistance – KDHE**

a. Support Section 319 demonstration projects for reduction of atrazine runoff from corn and grain sorghum cropland.
b. Provide technical assistance on practices geared to the establishment of vegetative buffer strips.
c. Guide federal programs, such as the Environmental Quality Improvement Program & Conservation Security Program, to support installation of pesticide Best Management Practices to the cropland drained by the Salt Creek watershed.

**Water Resource Cost Share & Nonpoint Source Pollution Control Program – Kansas Department of Agriculture, DOC**:

a. Support installation of pesticide management sites for storage, mixing and handling of atrazine and other pesticides.
b. Support pesticide best management practices to minimize pesticide runoff.

**Water Quality Standards – KDHE**

a. Request EPA finalize its aquatic life criteria for atrazine.
b. Incorporate revised atrazine criteria into Kansas surface water quality standards once criteria are finalized by EPA.

**Riparian Protection Program – Kansas Department of Agriculture, DOC**

a. Establish or reestablish natural riparian systems, including vegetative filter strips along small tributaries.
b. Develop riparian restoration projects in cropland areas.

**Buffer Initiative Program – Kansas Department of Agriculture, DOC**

a. Install buffer strips along small streams.

b. Work in conjunction with federal Conservation Reserve Enhancement Program and Conservation Security Program to hold marginal riparian land out of production.

**Extension Outreach and Technical Assistance – Kansas State University**

a. Educate corn and grain sorghum producers on pesticide management and effective BMPs that reduce atrazine runoff.
b. Provide technical assistance on buffer strip design, techniques to minimize cropland runoff and construction of pesticide handling pads.

**Pesticide Management Program – Kansas Department of Agriculture**

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) authorizes a State to regulate the sale or use of any federally registered pesticide in the State (FIFRA Section 24(a)). Under FIFRA, Kansas is authorized to initiate the process of making label changes on the use, application and provision of environmental protection of pesticides, if necessary to assure the attainment of the Water Quality Standard within this basin. The Kansas Department of Agriculture is the designated agency in Kansas that has pesticide management authority. Atrazine loads may be reduced through voluntary adoption of management practices. Among the activities promoted by the Kansas Department of Agriculture:

a. Implement pesticide bulk containment regulations.
b. Ensure label compliance by pesticide applicators
c. Harmonize product labels regarding use and protection measures
d. Implement any applicable provisions of the Atrazine Interim Reregistration Eligibility Decision by EPA
e. Continue basin pesticide education efforts through Kansas State and commodity associations.

**Timeframe for Implementation:** Pollutant reduction strategies and practices should be initiated by 2014 and continue through 2023.

**Targeted Participants**: The primary participants for implementation will be agricultural operations immediately adjacent to streams within the watershed that apply atrazine. Conservation district personnel and county extension agents should conduct a detailed assessment of sources adjacent to streams within the watershed over 2014. Implementation activities should target those areas with the corn and sorghum acreage that are located within a half mile of the streams within the watershed.

**Milestone for 2017:** In accordance with the TMDL development schedule for the State of Kansas, the year 2017 marks the next cycle of 303(d) activities in the Marais des Cygnes Basin to review data from the Salt Creek watershed to assess improved conditions. Should the impairment continue, adjustments to source assessment, allocation, and implementation activities may occur.

**Delivery Agents:** The primary delivery agents for program participation will be the State Conservation Commission, the Kansas University Extension Service and the

Kansas Department of Health and Environment. Ideally, implementation decisions and scheduling will be guided by planning documents prepared through WRAPS.

**Reasonable Assurances**:
Authorities: The following authorities may be used to direct activities in the watershed to reduce pollution.

1. K.S.A. 2-2439 empowers the Secretary of Agriculture to oversee pesticide management, registration and use in the state.

2. K.S.A. 2-2472 empowers the Secretary of Agriculture to establish Pesticide Management Areas to protect public health, safety, and welfare and the natural resources of the state from pesticide pollution.

3. K.S.A. 65-171d empowers the Secretary of KDHE to prevent water pollution and to protect the beneficial uses of the waters of the state through required treatment of sewage and established water quality standards and to require permits by persons having a potential to discharge pollutants into the waters of the state.

4. K.S.A. 2-1915 empowers the State Conservation Commission to develop programs to assist the protection, conservation and management of soil and water resources in the state, including riparian areas.

5. K.S.A. 75-5657 empowers the State Conservation Commission to provide financial assistance for local project work plans developed to control nonpoint source pollution.

6. K.S.A 82a-901, et seq. empowers the Kansas Water Office to develop a state water plan directing the protection and maintenance of surface water quality for the waters of the state.

7. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*, including selected Watershed Restoration and Protection Strategies.

8. The *Kansas Water Plan* and the Marais des Cygnes Basin Plan provide guidance to state agencies to coordinate programs intent on protecting water quality and to target those programs to geographic areas of the state for high priority in implementation.

9. The Federal Insecticide, Fungicide and Rodenticide Act authorizes the state to initiate the process of making label changes on the use, application and provision of environmental protection of pesticides.

**Funding:** The State Water Plan Fund annually generates $16-18 million and is the primary funding mechanism for implementing water quality protection and pollutant reduction activities in the state through the *Kansas Water Plan*. The state water planning process, overseen by the Kansas Water Office, coordinates and directs programs and funding toward watersheds and water resources of highest priority. Typically, the state allocates at least 50% of the fund programs supporting water quality protection through the WRAPS program. This watershed and its TMDL are a Low Priority consideration.

**Effectiveness:** The key to effectiveness in reducing atrazine levels in the Salt Creek watershed will be determined by the participation of corn and grain sorghum producers in the watershed to reduce inputs, particularly during the application window of wet weather in June and July.

## 6. MONITORING

KDHE will continue to collect samples through 2023 at the rotational station SC578 on Salt Creek on a quarterly basis every fourth year.

## 7. FEEDBACK

**Public Notice:** An active internet website was established at http://www.kdheks.gov/tmdl/index.htm to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Marais des Cygnes Basin. This TMDL was initially posted on the website on May 3, 2013 for public review.

**Public Hearing:** A Public Hearing on the Marais des Cygnes River Basin TMDLs was held on May 23, 2013 in Ottawa to receive comments. Public comments for this TMDL were held open from May 4 through June 7, 2013. KDHE did not receive any comments regarding this TMDL.

**Basin Advisory Committee:** The Marais des Cygnes River Basin Advisory Committee met to discuss this TMDL on September 14, 2012 in Fort Scott.

**Milestone Evaluation:** In 2017, evaluation will be made as to the degree of impairment continuing to occur within the watershed. Subsequent decisions will be made regarding the implementation approach, priority of allotting resources for implementation and the need for additional or follow up implementation in this watershed at the next TMDL cycle for this basin in 2017 with consultation from local stakeholders and the BAC.

**Consideration for 303(d) Delisting:** Salt Creek will be evaluated for delisting under section 303(d), based on the monitoring data over 2013-2022. Therefore, the decision for delisting will come about in the preparation of the 2024-303(d) list. Should modifications be made to the applicable water quality criteria during the implementation

period consideration for delisting, desired endpoints of this TMDL and implementation activities might be adjusted accordingly.

**Incorporation into Continuing Planning Process, Water Quality, Management Plan and the Kansas Water Planning Process:** Under the current version of the Continuing Planning Process, the next anticipated revision would come in 2014, which will emphasize implementation of WRAPS activities. At that time, incorporation of this TMDL will be made into the WRAPS. Recommendation of this TMDL will be considered in the Kansas Water Plan implementation decisions under the State Water Planning Process for Fiscal Years 2013-2022.

*November 6, 2013*

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**Appendix A**. NPDES Facilities in the Salt Creek Watershed.

| Permit | Facility Name | Facility City | NPDES Number | WLA |
|---|---|---|---|---|
| I-MC21-PO02 | HAMM - LIEBER/PLAGE #74 | LYNDON | KS0080853 | 0 |
| I-MC29-PR01 | BUILDERS CHOICE CONCRETE | OSAGE CITY | KSG110139 | 0 |
| M-MC21-OO01 | LYNDON, CITY OF | LYNDON | KS0024821 | 0 |
| M-MC29-OO01 | OSAGE CITY, CITY OF | OSAGE CITY | KS0022675 | 0 |

**Appendix B**. Permitted and Registered CAFO Facilities in Salt Creek Watershed.

| Permit | Facility County | Animal Totals | Permit Animal | WLA |
|---|---|---|---|---|
| A-MCLY-SA01 | Lyon | 275 | Swine | 0 |
| A-MCOS-BA20 | Osage | 750 | Beef | 0 |
| A-MCLY-M002 | Lyon | 60 | Dairy | 0 |
| A-MCOS-BA11 | Osage | 450 | Beef | 0 |
| A-MCOS-BA12 | Osage | 330 | Beef | 0 |
| A-MCOS-BA07 | Osage | 145 | Beef | 0 |
| A-KSOS-BA05 | Osage | 800 | Beef | 0 |
| A-MCOS-BA08 | Osage | 180 | Beef | 0 |
| A-MCOS-BA15 | Osage | 80 | Beef | 0 |
| A-MCOS-B007 | Osage | 800 | Beef | 0 |
| A-MCOS-BA22 | Osage | 200 | Beef | 0 |