

Section 10

Implementation

10.1 Introduction

While the majority of the Little Salt Creek watershed is in an agricultural land use today, there are approximately 1,200 acres within Lincoln's Future Service Limit where urban services and inclusion in the City limits are anticipated by 2030. Approximately 670 acres are within the Priority A area designated to be served with utilities in the next six years. In addition, there are some unique and special water resource considerations in this watershed, including the Eastern Nebraska Saline Wetlands, which are notably rare and form the habitat for the endangered Salt Creek Tiger Beetle (federally-listed), and the Saltwort plant (state-listed). Thus, it is appropriate to establish a foundation for implementing the capital improvement projects outlined in Section 9 and the water quality best management practice recommendations in Section 7. By establishing this foundation, water quality can be preserved, long-term stream stability can be maintained, and site specific flood hazards can be reduced. This section describes the different components of the implementation plan.

10.2 Implementation of Capital Improvement Projects

The capital improvement projects outlined in Section 9 of this report are stream stability projects. Projects 1 through 10 include grade controls along the main stem at bridge crossings and projects 11 through 18 are stilling basins as outfall protection at the downstream end of culverts. It is expected that the stream stability projects will be constructed as part of road improvement projects when they take place.

As described in Section 9, the recommended capital improvement projects were classified as primary or secondary and categorized using the Prioritization Methodology Report for Watershed Master Planning Projects, City of Lincoln, Nebraska, 2006. All 18 capital improvement projects are classified as secondary because they are in areas of infrequent flooding, or stream degradation or instability existing that is propagating very slowly and/or is not likely to propagate to other areas of the watershed. Although each project is categorized secondary, each are given a different project ranking based on their priority score.

10.3 Policy, Ordinances and Resolutions

- **Drainage Criteria Manual Revisions** – It is recommended that the City's manual should be updated to reflect the recommendations outlined in Section 7. These revisions include changing the City's current stormwater BMP program from a voluntary to mandatory program for site-specific structural BMPs as outlined in the Stevens Creek Watershed Master Plan for both the integrated detention facilities and alternative site design approaches.
- **Ordinances** – The implementation of site-specific structural BMPs and required maintenance activities may require modifications to City ordinances.

10.4 Education Program

- **Water Quality Education** – A proactive education program focusing on water quality issues should be developed to educate homeowners associations and private facility owners. The program may include a water quality seminar to address the primary sources of stormwater pollution; the methods for pollution reduction and removal, including both nonstructural and structural BMPs; and the proposed new maintenance requirements.
- **Structural BMP Design Workshop** – A Structural BMP Design workshop could be held to educate engineers and developers on designing and constructing structural BMPs. Providing this education will ensure proper BMP design, which will streamline the plan review process. The workshop would primarily focus on design guidance for extended wet and dry detention basins.
- **Natural Channel Design Workshop** – A Natural Channel Design workshop could be held for engineers and developers focused on using bioengineering and geomorphic techniques for stream stabilization. The workshop would include proper design techniques for grade control structures and streambank stabilization materials.

10.5 Project Funding

Traditional funding options for the Capital Improvement Projects include City stormwater bonds, funding from the Lower Platte South Natural Resources District, and County funding for stream stability measures where appropriate in association with County road improvement projects. For the water quality best management practice recommendations outlined in Section 7, a public-private cost share program supported by the City and NRD is anticipated as outlined in the previously adopted Stevens Creek Watershed Master Plan. City and NRD funding is anticipated to be provided on a first-come, first-serve basis and be contingent upon City and NRD approval of the proposed cost-share program. In addition, the cost-share program would be subject to yearly budget approvals, voter approval of general obligation bonds, and NRD board approval.

The Riparian Corridor Program could be implemented using one of the existing tree planting programs available to landowners through the LPSNRD or USDA as follows:

- The NRD Conservation Forestry Program in which participants have the opportunity to purchase seedling trees in bulk through the NRD.
- The NRD Tree Cost-Sharing Program where volunteers can be reimbursed up to one half the total cost of trees and planting for quantities between 1,500 and 4,000 trees.
- The NRD Tree Planting Program makes cost-shared planting services available for those wanting to plant between 200 and 1,500 trees.
- The USDA Conservation Reserve Program (CRP) is a voluntary program in which landowners are paid for every acre the landowner enrolls in the program. There is also a 50% cost-share for tree planting through this program.

- The NRCS Environmental Quality Incentives Program in which financial assistance is provided for implementation of either structural or land management practices including the addition of vegetation. The cost sharing is available to agricultural producers in compliance with Highly Erodible Land and wetland conservation provisions and gives special consideration to landowners addressing priority natural resource concerns.

By using these existing programs to develop and restore the watershed riparian corridor, efficiencies are achieved by working with programs already in place. These programs already have the funding mechanisms established and administrative structure in place, ready to help.

The Structural Improvement Recommendations will be funded through the City and County roadway project improvements. Although no natural resource recommendations were developed with this Master Plan due to ongoing research, funding for the goal of preserving these natural resources can be researched. Multiple avenues to get funding to preserve natural resources are listed below with brief summaries for the less well know opportunities:

- Natural Resource Conservation Service (NRCS)
 - Wildlife Habitat Incentive Program provides technical assistance and up to 75% cost share for activities that protect, restore, develop or enhance habitat for upland wildlife, wetland wildlife, threatened and endangered species and others. The participant or other non-federal entities provide the remaining funds. This program is available to private landowners meeting the Highly Erodible Land and Wetland Conservation requirements. AGI requirements and able to demonstrate control over the land involved in the project. The cost share period is a minimum of five to ten years. Examples of funded projects include stream bank stabilization, native tree planting and restoration of native grasslands.
 - Watershed Protection and Flood Prevention provides financial assistance in the form of cost sharing for sedimentation control, agricultural water management, watershed protection and others. Examples of projects funded include improvement of fish and wildlife habitat, correction of erosion and sediment damage and flood control. State and local agencies are eligible recipients.
 - Wetland Reserve Program (WRP)
 - Conservation Reserve Program (CRP)
- US Department of Agriculture
 - Water Quality Special Research Grants Program focuses on the identification and resolution of agriculture-related degradation of water quality. The program requires a watershed-based approach to managing erosion, sedimentation, wetland creation and restoration and flood protection.
 - Integrated Programs funded by the Cooperative State Research, Education and Extension Service provides funding in the form of competitive grants to universities and others to address breakthroughs in agricultural science. The grant period may be up to three years. Examples of successful projects include

preservation of rural watersheds and accelerating riparian buffer adoption to enhance water quality.

- United States Fish & Wildlife Service (USFWS)
 - State Wildlife Grants
- Department of the Interior - National Park Service
 - Conservation Activities by Youth Service Organizations. In this program assistance is provided in the form of grants to state and local agencies or nonprofit institutions and organizations to support youth career training in resource management and conservation. The funding can support implementation of conservation activities such as restoration of degraded land, erosion control, site preparation and revegetation.
- Environmental Protection Agency (EPA)
 - Assessment and Watershed Protection Program Grants are available to support training and demonstration relating to the extent, prevention, reduction and elimination of water pollution. The funding is available to state and local government as well as non-profit organizations. Examples of eligible activities include validation of practices for nutrient pollution reduction, monitoring and assessment, training handbooks on sustainable design and demonstration projects on new techniques to control agricultural drainage.
 - Targeted Watershed Grants provides funds to organizations with existing watershed plans ready to implement water quality projects that produce tangible, measurable improvements in a short time frame of two to five years. The EPA places priority on projects demonstrating thorough knowledge of the watershed, broad-based support from public and private entities and a record of successfully implementing and managing watershed projects.
 - 5-STAR Restoration Grant Program
 - Clean Water Act Section 319 Grant
- Nebraska Environmental Trust

10.6 Coordination Efforts

A coordinated effort between the City, NRD, and the County needs to be established to guide the implementation of the Master Plan. For example, as roadways are upgraded, the design data developed for stream crossings and recommendations within the Master Plan associated with the particular stream crossing should be used during the design. In addition, the design, construction, and maintenance of structural BMPs need to be closely monitored and enforced by all agencies to make sure these facilities are properly managed.

The unique natural resources and endangered species associated with the Little Salt Creek Watershed and ongoing research require governing agencies, developers, and the researchers to coordinate their efforts to develop the best possible solutions for preserving these natural resources. If possible, the City, NRD and County should collaborate with university faculty and graduate students particularly regarding additional water quality data. Leveraging talent, institutional resources and experience will improve the likelihood of achieving significant funding from the sources described above. Some of the programs described here address the broad issues of watershed planning while others are narrowly targeted to a single

constituency or problem. Both additional research and implementation are available for funding. It may be helpful to develop a mosaic of needs and opportunities and to lay out a desired timeline and partner for meeting each need.

10.7 Additional Studies

The water quality testing was limited to two dry weather sample events in the same season. The tests were general and did not provide specific information regarding potential pollutants. Dr. Ed Harvey has indicated that he and others at UNL are in the process of compiling data and finalizing reports based upon more extensive water quality testing that could further inform future management strategies. It is recommended that the City and NRD acquire this information once the reports are finalized and published. At such time, a complementary study to support management decisions could be designed or this Master Plan could be updated to provide additional guidance.

For example, if the University-funded work is concentrated in the Salt Creek Tiger Beetle habitat and measures parameters that are narrowly focused on this organism then an appropriate complement to the ongoing work would be to design testing programs that assess water quality outside of the Tiger Beetle habitat and that fill in any gaps in the within-habitat areas that pertain to more general water quality concerns.

While the interpretation of the water quality data available for review is complicated by the presence of the salt marshes, there are some results that strongly suggest degradation irrespective of saline conditions. The prevalence of organisms associated with nutrient enrichment and hypoxic sediments throughout the watershed merits further investigation. Establishing the extent and severity of this potential problem should be the focus of future studies. These studies should be frequent enough to detect seasonal variations, reflect a range of flow conditions and measure parameters associated with nutrient enrichment. Excessive nitrogen or phosphorous compounds can cause eutrophic conditions. Testing for total nitrogen (TN) is a good place to start. If TN is high, then it may be helpful to distinguish between ammonia nitrogen and nitrate nitrogen. Ammonia is toxic to aquatic life even at low levels and if it should prove to be a pollutant might require a swifter response. Phosphorous is frequently the limiting factor in algae growth. At a minimum, total phosphorous should be part of the routine sampling protocol. The bio-assessment also indicated that the populations of the stream biota were influenced by warm water. Temperature measurements are simple, inexpensive additions to a sampling procedure and will help assess the effectiveness of the reforestation efforts. Biological oxygen demand is important and should be included in the testing as well as the dissolved oxygen levels. The initial dissolved oxygen concentration is part of the 5-day BOD testing so obtaining this result separately should not present a significant cost. While the BOD indicates the amount of oxygen consumed by bacteria, it would be helpful to know how much oxygen is dissolved in the water at the onset of the test. If the dissolved oxygen is too low to support diverse life, then water quality is poor even if the BOD is low.

Additional bio-assessment testing could be performed at sites were Salt Creek Tiger Beetle currently live. The bio-assessment procedures will be based on EPA guidance as published in Rapid Bio-assessment Protocols for Use in Streams and Wadeable Rivers: Periphyton,

Benthic Macroinvertebrates, and Fish (1999). Evaluation of Periphyton and Benthic Macroinvertebrate would provide data on potential prey for the Salt Creek Tiger Beetle. The assessments should be conducted in July when the beetles are feeding on the streambanks. The EPA protocol can be fine tuned without violating the quality or integrity of the process. Dr. Steve Spomer of UNL should play an important role in determining the locations, timing and sampling details to obtain the most useful information from the study. Outside the beetle habitat, the bioassessment performed in this study was productive. It is reasonable to repeat a similar assessment watershed-wide every couple of years.

10.7.1 Additional Studies Summary

In summary the water quality information outlined below is one approach to developing a more comprehensive basis for stream management:

- Water chemistry
 - Temperature
 - Dissolved Oxygen
 - Total Nitrogen – if problematic, consider
 - Ammonia-nitrogen and nitrate-nitrogen
 - Total phosphorous
 - 5-Day BOD
 - TDS or salinity

The above tests should be conducted at least seasonally and more often if resources permit.

- Stream bio-assessment
 - In beetle habitat – in close coordination with university experts regarding schedule, frequency and details of sampling
 - Elsewhere in the watershed, follow-up assessments every couple of years will more accurately reflect progress in improving water quality than individual chemical tests.

10.7.2 Phase II Scoping

Because sediment appears to be an important element of watershed stability, water quality and critical habitat it may be helpful to gain a fuller understanding of sediment generation and fate. The following are areas that merit consideration and may be candidates for external funding support.

- Work with USGS and US Fish & Wildlife to develop a sediment balance/ sediment yield analysis and an evaluation of its effect on water quality. The USDA, National Sedimentation Laboratory also has extensive experience in this region including Little Salt Creek and may be an excellent partner as well.
- Consider installing automated turbidity threshold water quality sampling to determine sediment loads as a function of flow regimes. Automated sampling allows acquisition of samples during flow events that cannot practically be sampled using manual techniques particularly in the basins that react most quickly to rain events. The turbidity threshold may be more useful than stage dependent sampling because the delivery of sediment to the stream from the surrounding land is highly variable and not closely correlated with stage. However, turbidity is well correlated to suspended solids concentration and provides a more accurate estimate of total load.

- Two and three-dimensional hydraulic and water quality models could yield a better understanding of stream dynamics.

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