

INDIAN CREEK WATERSHED



5/7/2013

Working for a clean, unpolluted, safe, and healthy Indian Creek Watershed

On January 26, 2012 a group of stakeholders representing various interests in the Indian Creek Watershed convened for the first of a series of five Visioning workshops to identify common concerns, shared priorities, and to lay out a path for creating positive change in the watershed. The Visioning workshops were facilitated by the Iowa-Cedar Basin Interagency Coordination Team (ICT), a group of state, federal, NGO, and academic institutions that cooperate to support planning and watershed-based decision making efforts in the Iowa-Cedar River Basin.

Indian Creek Watershed

WORKING FOR A CLEAN, UNPOLLUTED, SAFE, AND HEALTHY INDIAN CREEK WATERSHED

EXECUTIVE SUMMARY

Pervasive water quality concerns and frequent flooding incidents have drawn attention to Indian Creek, a valued resource that has been degraded as a result of changing land use. Recently, five political jurisdictions within the Indian Creek watershed came together to form a Watershed Management Authority with funding made available through Iowa Economic Development Authority from federal disaster relief funding. This group will work with a Community Advisory Committee to develop a comprehensive watershed management plan for Indian Creek and its tributaries.

In addition to these local efforts, an agency-facilitated process occurred during 2012 with the goal of facilitating a planning and visioning process and providing technical support to watershed improvement efforts. This initiative was guided by the Iowa-Cedar Watershed Interagency Coordination Team (iowacedarbasin.org), a group of state and federal agencies, non-profits, and universities in Iowa. On January 26, 2012 a group of stakeholders representing various interests in the Indian Creek Watershed convened the first of a series of five 'Shared Vision Planning' workshops to identify common concerns, shared priorities, and to lay out a path for creating positive change and supporting science-based decisions in the watershed.

KEY FINDINGS & RECOMMENDATIONS

A number of key recommendations are listed below. These are recommendation that were generated by the stakeholders during various discussions of challenges and opportunities in the watershed. The recommendations are grouped into themes that emerged early in the visioning process.

Reduce Flood Risk:

- Investigate key policy changes that may reduce flood risk for Indian Creek Watershed residents, such as a moratorium on building within floodplain areas (even with recommended elevations)
- Develop educational campaigns geared toward targeted stakeholder groups, such as homeowners, realtors, developers, policy makers, and farm managers.
- Develop a coordinated effort to promote non-structural Best Management Practices (BMPs) that reduce runoff in the Indian Creek Watershed, in both urban and agricultural landscapes
- Investigate the potential of structural solutions to reduce flood risk, such as a dam, retention ponds, or other methods to hold back / divert water
- Emphasize that clean-up costs from severe flooding are greater than the costs of implementing mitigation measures

Improve Water Quality:

- Conduct water quality monitoring of Indian Creek and its tributaries to characterize the extent and magnitude of water quality issues

- Develop an educational campaign to communicate the benefits of setting aside marginal agricultural lands for conservation purposes
- Conduct a BMP suitability analysis to target BMP types and locations
- Facilitate opportunities for citizens to take action, such as through storm drain marking events or volunteer 'snapshot' monitoring events, to raise awareness and help reconnect citizens to the Indian Creek Watershed
- Coordinate with other groups, such as the local food movement, to emphasize the multiple benefits of clean water

Enhance Recreation:

- Create opportunities for citizens to learn about and experience Indian Creek, such as an Indian Creek Festival or guided paddle trip, or 'Meet Indian Creek' events at local parks
- Promote Indian Creek Watershed educational opportunities through local schools
- Identify where access points could be added or enhanced to facilitate safe enjoyment of Indian Creek (canoe access, fishing, nature viewing, trails, etc)
- Conduct multi-jurisdictional planning to promote the Indian Creek Watershed as a recreational destination (trails, parks, paddling during appropriate conditions)

Urban Development:

- Encourage each community in the watershed to implement the stormwater utility proposed by the Cedar Rapids Stormwater Commission, and use funding to offset the costs of implementing stormwater BMPs
- Conduct an economic study of the impacts of repeated flooding on the community, and the financial benefits of reducing flood risk
- Identify similar communities that have implemented sound development policy and achieved a reduction in overall flood risk

Agricultural Land Management:

- Explore the possibility of establishing a dedicated watershed project that would provide additional cost-share funding to farmers and would assist with BMP targeting and implementation
- Inventory BMPs currently implemented in the watershed
- Promote strategies such as no-till and cover crops that improve soil health
- Develop and implement an education campaign that targets various stakeholder groups including non-operator landowners, farm managers, women landowners, beginning farmers, and older farmers; emphasize soil health, conservation leases, and existing cost-share programs

INTRODUCTION

Indian Creek is a HUC10 watershed (0708020601) located entirely within Linn County, Iowa. Indian Creek is fed by Dry Creek and Squaw Creek, and ultimately drains to the Cedar River near the intersection of Otis Road SE and Bertram Road, south of Mt. Vernon Road SE. The Indian Creek watershed spans 93 square miles of urban and rural lands primarily in the lowan Surface landform region, with a small area in the lower portion of the watershed in the Southern Iowa Drift Plain. Agriculture is the dominant land use in the watershed, with approximately 52% of the watershed dedicated to row crop agriculture (corn and soybeans). Urban land uses (residential, commercial, industrial, and roads) make up another 13% of the total watershed area, particularly in the southern half of the watershed. The map on the following page shows an aerial view of the Indian Creek Watershed (Figure 1).

GOALS & OBJECTIVES

There were several overall goals for convening the Visioning workshops:

DEVELOP A VISION FOR THE INDIAN CREEK WATERSHED

The overall goal of the workshops was to bring together a diverse group of stakeholders from the Indian Creek Watershed to create a shared vision for the watershed that supports ecological, economic, and social priorities. Several vision statements were developed by the stakeholders, and one in particular summarized the priorities and concerns in simple language:

“Indian Creek has clean, unpolluted, safe, and healthy water”

MAP A PATH FORWARD FOR STAKEHOLDERS TO IMPROVE INDIAN CREEK WATERSHED

The workshops sought to use the shared vision as a starting point for a broader watershed improvement effort. The first step was to facilitate information sharing about watershed conditions, and second to evaluate the tradeoffs associated with different land use practices. The third step in the process was to identify and discuss the opportunities available to improve the watershed.

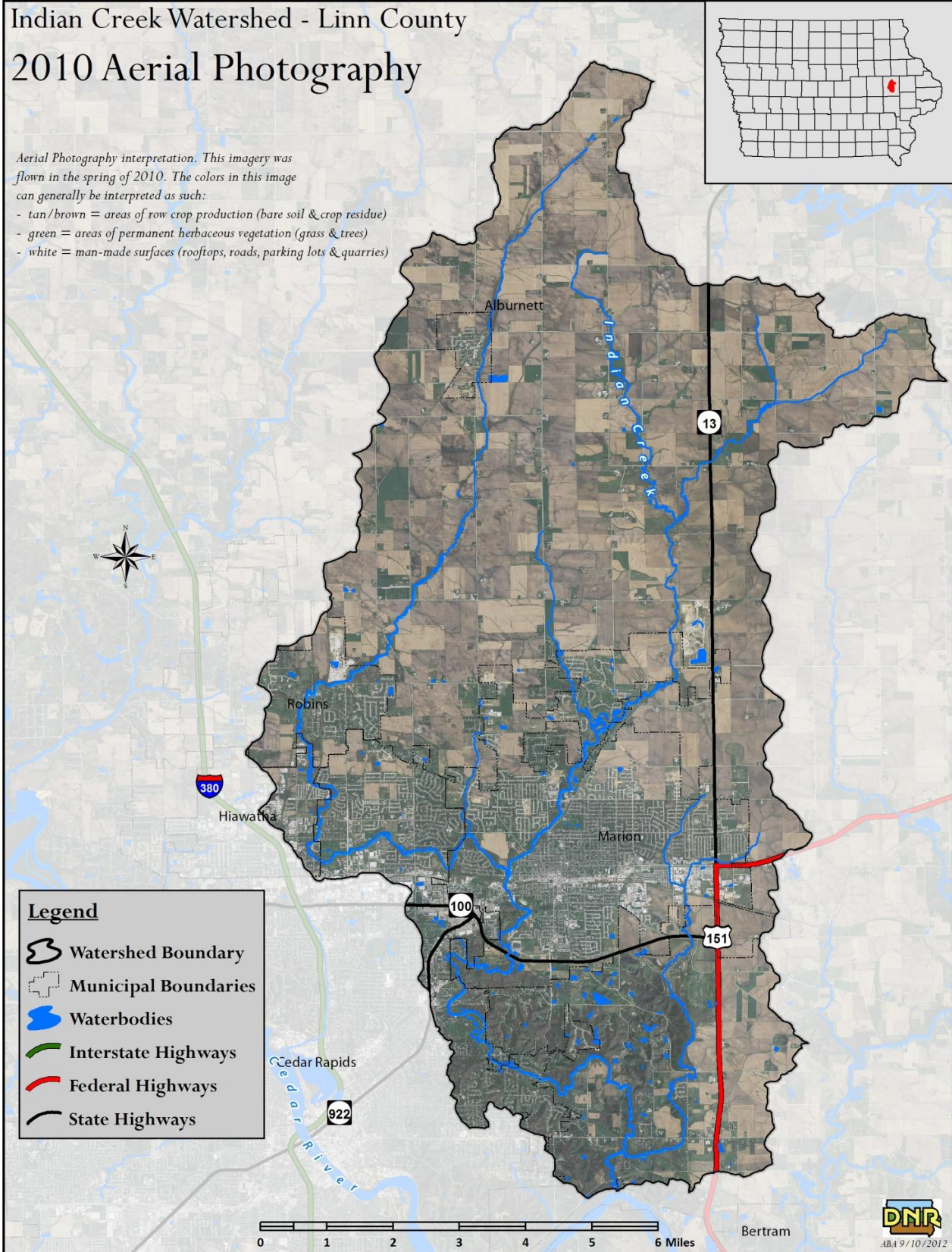
SUPPORT THE INDIAN CREEK WATERSHED MANAGEMENT AUTHORITY

Federal and state agencies facilitated the Visioning workshops, but locally-led efforts and leadership is essential to make an impact in the watershed. The newly forming Indian Creek Watershed Management Authority is expected to be a key leader in promoting and supporting flood risk reduction and water quality improvement. Since watershed planning is increasingly moving towards a community-based approach, identifying the public's goals and objectives for the Indian Creek Watershed helped lay some initial groundwork for the WMA's planning effort.

Indian Creek Watershed - Linn County 2010 Aerial Photography

Aerial Photography interpretation. This imagery was flown in the spring of 2010. The colors in this image can generally be interpreted as such:

- tan/brown = areas of row crop production (bare soil & crop residue)
- green = areas of permanent herbaceous vegetation (grass & trees)
- white = man-made surfaces (rooftops, roads, parking lots & quarries)



Legend

- Watershed Boundary
- Municipal Boundaries
- Waterbodies
- Interstate Highways
- Federal Highways
- State Highways

CONDITION OF THE INDIAN CREEK WATERSHED

It was important to present data and information of the current state of conditions in the watershed in order to determine how best to approach watershed improvement. Through a variety of discussions and presentations over the course of the five Visioning workshops, several themes about watershed conditions emerged, which are detailed below. Drivers and resisters to change were also discussed.

FLOODING

Major flood events: Flooding is a pervasive concern in the Indian Creek watershed. The most notable flood occurred in June 2002 following an intense rain event of at least 6 inches in the watershed. According to the USGS Open-File Report 2004-1074, peak discharge at East Post Road in the lower reaches of the watershed were determined to be 24,300 ft³/s, greater than the 500-year flood event. Extensive damages to personal property and municipal roads and infrastructure were sustained in Cedar Rapids, Marion, and Hiawatha. In Marion alone, damages reached \$3.5 million. Stakeholders also expressed concern about flash flooding in Indian Creek, which causes creek levels to rise very quickly even after only a relatively small amount of rain.

Participants felt that strategies such as promoting sustainable agricultural and development practices, in particular a moratorium on building / agriculture in the floodplain, would help to reduce flood risk. Barriers to achieving these goals were identified such as people preferring to live near the water, current building codes, and the fact that it takes time and money to build an effective educational campaign.

WATER QUALITY

Impaired Waters: Both Indian Creek and Dry Creek are considered impaired by the State of Iowa, meaning water quality does not meet acceptable standards set by the state. High levels of bacteria in the water were measured on multiple occasions, indicating a potential risk to public health from making contact with the water. The bacteria may come from a variety of sources, including contamination from failing septic or sewer systems, livestock facilities, and / or wildlife such as Canada geese. Indian Creek is also considered impaired due to a lack of healthy aquatic life such as fish and aquatic insects.

- *Coe College Monitoring Project:* Dr. Marty St. Clair presented information on an on-going water monitoring project involving students from Coe College, in which water sampling is routinely conducted on Indian Creek. Their data show levels of nitrate, which predominantly originates from agricultural fertilizers, have failed to meet the acceptable maximum of 10 mg/L in the northern agricultural portions of the watershed. In addition, the College's monitoring program found high levels of bacterial contamination.
- *Stream Water Clarity:* Rich Patterson, Director of the Indian Creek Nature Center, gave a presentation at the first Visioning workshop and described how Indian Creek is notably muddier today than it was 30 years ago. The muddiness of the creek is a result of a higher sediment load in Indian Creek, which can originate from farm fields, urban development that causes disturbance of the soil, and erosion of stream banks.

The participants believed that there is a critical need to reduce nitrogen, phosphorus, bacteria, and sediment in Indian Creek through increased use of Best Management Practices. However, they noted several challenges such as property rights and limited regulation, demographics of producers (such as older farmers who may not be willing to try new practices) and a rural / urban divide that creates overall distrust and perpetuates a 'blame game.'

RECREATION

Paddling: Participants in the Visioning workshops reported that paddling opportunities are limited due to highly fluctuating water levels. However, other participants described very positive experiences floating Indian Creek.

Nature enjoyment: Several participants shared stories of bringing children to Thomas Park to wade and play in Indian Creek.

Discussions in the Visioning workshops indicated that the public tends to view Indian Creek as dirty, and therefore unsafe, which has led to citizens valuing the resource less. There was an overall sense among participants that creating more opportunities for the public to enjoy Indian Creek would contribute to a shared sense of responsibility and motivation to protect the watershed. Some participants felt that a dam would be beneficial for creating more recreational opportunities and mitigating flood risk, though others felt that a dam was not a sound solution.

URBAN CONCERNS

Urban Development: A common theme was how to effectively handle the stormwater runoff resulting from rapidly expanding development, which tripled impervious surface in the watershed during the period of 1960 – 2011. The stakeholders present felt that there were not sufficient incentives (or disincentives) to implement sustainable development practices, and that the perceived barrier of higher costs to sustainable development were an issue as well. Many participants felt a stormwater utility would be an effective means to create a funding source for BMPs and would create a disincentive for increasing impervious surface.

AGRICULTURAL CONCERNS

Land Management: The stakeholders believed that maintaining healthy and productive agricultural lands is a priority for the watershed. Promotion of BMPs was an overarching theme, yet there was general agreement that current commodity prices and a lack of cost-share funds limited the widespread adoption of conservation practices. There was agreement that more incentives should be available to encourage adoption of various practices, such as drainage water management, ponds / wetlands, bioreactors, and other. Participants also felt that there was a lack of information about suitable BMPs in both urban and agricultural areas.

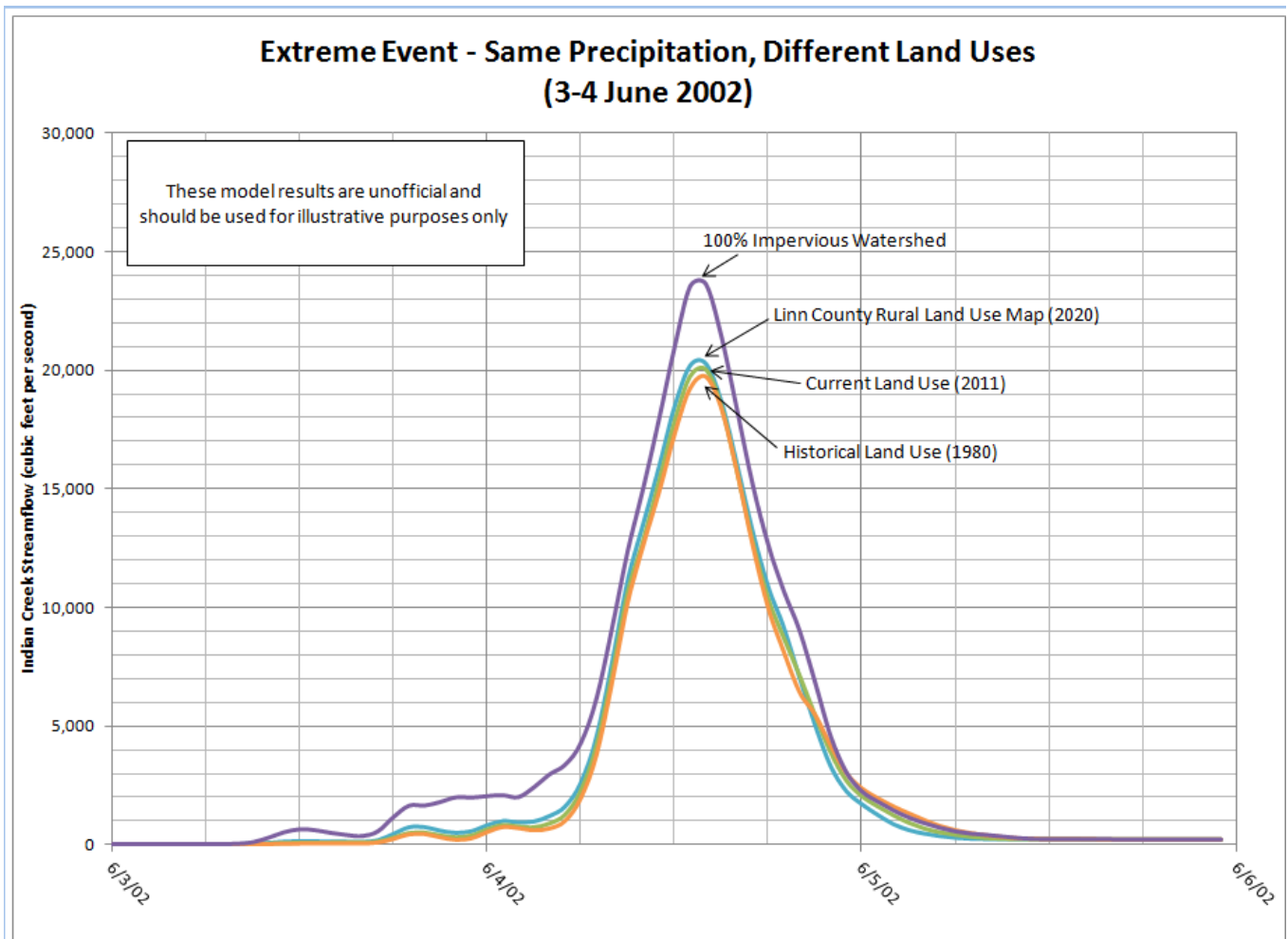
FLOOD RISK MANAGEMENT

US Army Corps of Engineers (USACE) developed a number of maps based on the results of a hydrologic model showing how flood risk could increase over time in the Indian Creek watershed. One of the major take-home messages is that when planning for future flood risk, there are two factors that need to be considered: climate change and land use change. There is agreement among climate scientists that in Iowa, precipitation is likely to increase, especially in the spring, with the potential for summers to be hotter and more extreme (wetter or drier). Storm events of various types are also predicted to become more extreme. Based on this, participants agreed in follow-up discussions that it is critically important to focus on land use, as we have the ability to control how we manage our urban and agricultural lands, while we can not affect climate.

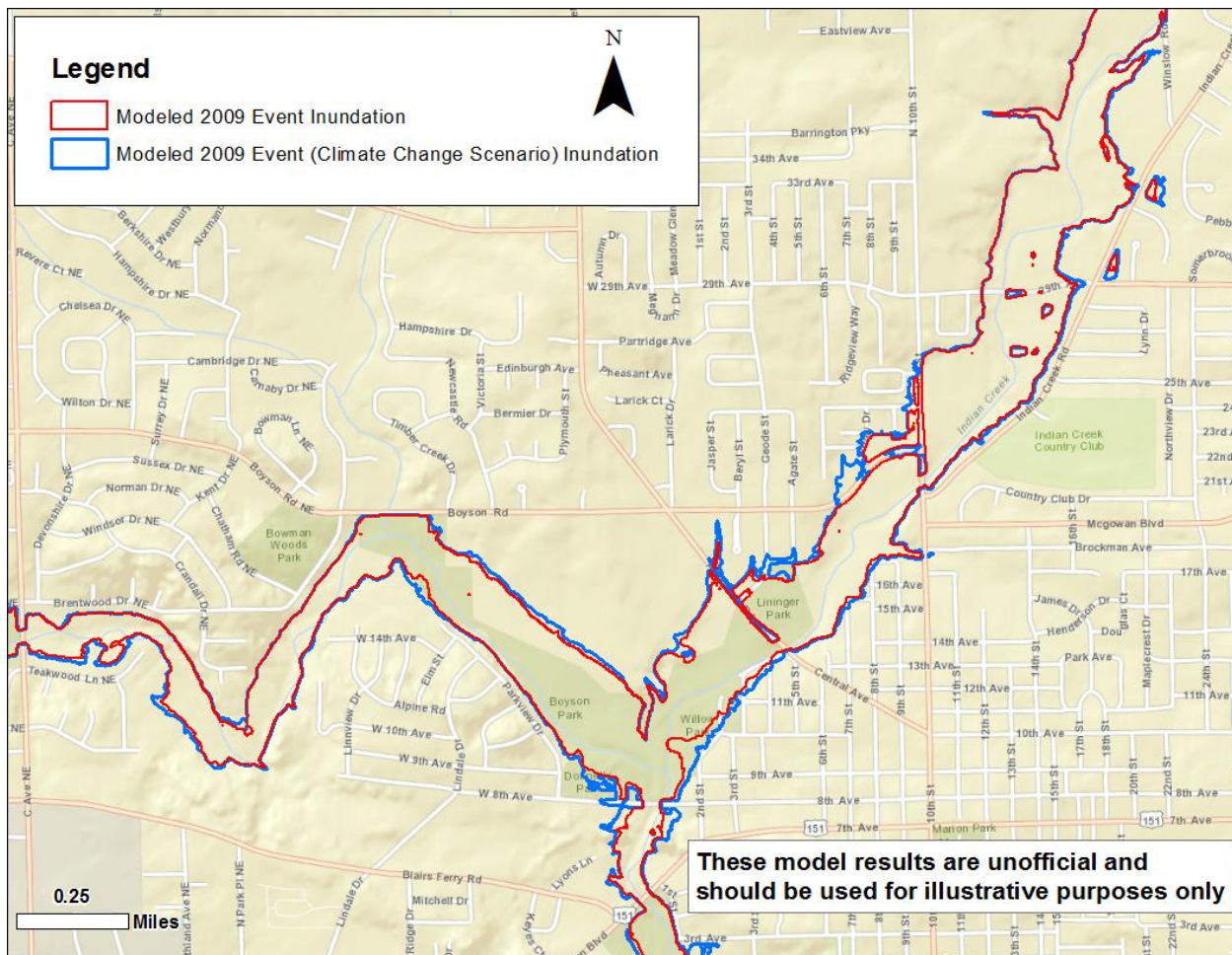
The USACE developed maps showing how streamflow (and therefore flood risk) can increase based on how the land is managed. The maps were developed by using data from the catastrophic 2002 flood in Indian Creek and tweaking the amount of impervious surface in the watershed. Higher amounts of impervious surface (developed areas, such as parking lots and rooftops, as well as frozen ground, and to some extent,

agricultural lands without conservation practices) will lead to increased runoff and as a result, higher streamflows / flooding.

The graph shown below (Extreme Event – Same Precipitation, Different Land Uses), illustrates how the 2002 flood could have been more or less severe under different land management scenarios in the watershed. The yellow, green, and blue lines indicate what streamflow levels would have looked like in the 2002 flood under the three different management scenarios shown: Indian Creek Watershed prior to 1980, Indian Creek Watershed today, and Indian Creek Watershed if the 2020 Future Land Use Plan developed by Linn County were to come to fruition. The pre-1980 scenario, which had the least amount of developed (impervious) land, had a lower peak flow than the 2020 scenario. However, the 100% impervious scenario – which could be seen in an early spring rainfall event when the ground is still frozen, as was seen in March 2013 – illustrates how an unpredictable climate can lead to a catastrophic flood event, and underscores the importance of careful land use planning in the floodplain.



Similarly, the map below shows how flooded areas could change based on the results of climate change models. The red line indicates the extent of inundated areas during the 2009 flood in the Indian Creek Watershed; the blue line shows the additional area of inundation area that could be expected in the type of future storm event that climate models are predicting. **It is evident that future land use planning should take into account the greater amount of land area that will be at risk as a result of climate change.**



VISIONING WORKSHOP SUMMARIES

An overview of the each workshop in the series is provided below:

- Workshop 1 – Objectives and Visions, 53 participants (Jan 26, 2012)
- Workshop 2 – Challenges and Enabling Factors, 36 participants (March 29, 2012)
- Workshop 3 – Performance Metrics, 29 participants (May 22, 2012)
- Workshop 4 – Watershed Assessment, Floodplain Mgt, Public Outreach, and Climate Change, 21 participants (August 9, 2012)
- Workshop 5 – Transitions to next steps, Action Planning (September 25, 2012)

WORKSHOP 1 – OBJECTIVES AND VISIONS

On January 26, 2012, over 50 stakeholders from the Indian Creek watershed convened at the Marion City Council Chambers to kick off a focused dialogue and planning process for the watershed. The day started off with brief presentations about the Indian Creek Watershed and with introductions from the ICT. Participants worked as partners and in small groups of six to eight people in order to establish their vision statement and goals which guided the remainder of the dialogue process. The group identified vision statements and goals

related to the management of water quantity and quality, agricultural land management, urban development, recreation, ecosystem health, as well as a number of social behavior goals related to getting the whole community to understand the watershed and their impact, to feel a sense of urgency, to be accountable for their actions, and to all work together.

The small groups generated thirteen vision statements that each reflected the need to reduce flood risk, improve water quality, promote local responsibility and accountability, and enhance recreation. One vision statement in particular summed up each of these overarching concerns in very simple, straightforward language:

Indian Creek has clean, unpolluted, safe, and healthy water

WORKSHOP 2 – CHALLENGES AND ENABLING FACTORS

On March 29, 2012, 36 stakeholders participated in the second Visioning workshop, which sought to lay out the challenges and opportunities in achieving the visions identified in the first workshop. Dr. Marty St. Clair, Professor of Chemistry, Coe College, presented water sampling data for the watershed, noting that nitrogen concentrations peak after significant rainfall events and that *E. coli* levels are often high. Toby Hunemuller, Chief Hydrologist, USACE-MVR, presented on development and precipitation trends, noting that precipitation is occurring more frequently and with greater variability of intensity. Next, because many of the participants expressed impatience with the lack of change since the 2002 and 2008 floods, the pilot team led groups in brainstorming the challenges and drivers to implementing change. Again, major concerns were raised associated with a need for public education. The group's perception is that the majority of watershed residents lack appreciation for the creeks and don't recreate there, and thus, lack motivation to protect the resource or take action to manage flood risk.

WORKSHOP 3 – PERFORMANCE METRICS

On May 22, 2012, 29 stakeholders participated in the development of performance metrics for the watershed. The group reviewed and revised a draft set of Effectiveness Metrics to measure physical changes, and then brainstormed Acceptability Metrics to determine if an action would be socially acceptable or feasible with current laws and regulations. Economic metrics were also included.

WORKSHOP 4 – WATERSHED ASSESSMENT, FLOODPLAIN MGT, PUBLIC OUTREACH, AND CLIMATE CHANGE

On August 9, 2012, 21 stakeholders participated as Stacy Langsdale facilitated plenary and working group dialogue regarding steps they can take to reduce flood risk and improve the watershed. In the breakout group's participants explored resources for developing a comprehensive watershed plan, considered land use in the floodplain as well as factors that change "the floodplain", and explored opportunities for building public awareness of watershed issues. The pilot team presented new information on the influence of land use change and Rock Island District Hydrologic Engineer Greg Karlovits presented information related to potential climate change impacts on hydrologic response for moderately large precipitation events. The key take-home points conveyed in the presentation included:

- Climate models for Iowa suggest:
 - Several degree increase (1 – 6.5 °C) in overall temperature by the end of the 21st century
 - Shifts toward more winter rain and spring storms
 - Hotter summer with more extreme (high or low) rainfall
 - Increase in overall unpredictability of weather
- There is increased potential for both flooding and drought
- Annual precipitation may increase and shift towards more frequent storms with heavy rainfall
- Increased summertime heat could lead to more crop stress and increased water demand
- Land use change and climate change together will affect hydrology in unknown ways

WORKSHOP 5 – TRANSITIONS TO NEXT STEPS, ACTION PLANNING

On September 25, 2012, 19 stakeholders discussed the next steps required for this group to take the lead and continue efforts to improve the watershed. A guest speaker from a nearby watershed shared their experience of leading an Advisory Board, presented the steps they took, and resources utilized. The group was also updated on the status of the formation of a Watershed Management Authority, and how they can support it in the future, including building public awareness and support. Finally, in order to tie the group from initial goals to tangible actions on the ground the pilot team displayed aerial imagery of urban and rural areas with resource concerns and presented examples of hypothetical actions at the various sites, identifying how certain actions could achieve certain goals that were defined in the first three workshops.