RFP #660

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

REQUEST FOR PROPOSAL TO DEVELOP A HYDROLOGIC AND HYDRAULIC MODEL OF THE BIG SIOUX RIVER BASIN

INTRODUCTION

The Department of Environment and Natural Resources (DENR) is seeking proposals from qualified firms to produce a hydrologic and hydraulic model and an inundation mapping tool for the Big Sioux River Basin.

BACKGROUND

The Big Sioux River Basin has historically experienced repeated flooding. A major flood in the lower basin in 2014 revealed the lack of understanding of how this area behaves hydrologically during flood events. Available data are not adequate to enable state and local authorities to prepare for imminent flood events. State and local governments need an accurate hydrologic and hydraulic model of the basin in order to predict the severity of flood events under a range of climatic events and implement appropriate defenses. This project will fund a hydrologic and hydraulic study that will provide state and local entities with information necessary to better prepare for future flood events in the lower basin. The data and model generated from this study will allow the state to predict the impacted areas for a range of flood scenarios. Of particular benefit will be the understanding of how flows during a flood are impacted when they enter the Missouri River floodplain. Another benefit will be to quantify how low flows and high flows in the Missouri River impact flood events in the lower Big Sioux River Basin. This will allow state and local entities to implement appropriate protection strategies in advance of flood waters.

AVAILABLE DOCUMENTS AND DATA

The following documents are available on request from the Request for Proposal (RFP) Point of Contact. See page 7 for RFP contact information.

- Climate and Streamflow Characteristics for Selected Streamgages in Eastern South Dakota, Water Years 1945-2013, U.S. Geological Survey Scientific Investigations Report 2015-5146, 2015

- Geomorphic and Hydrologic Controls on Flooding in the Lower Big Sioux River Basin, Tim Cowman, Presentation to the Western South Dakota Hydrology Conference, Rapid City, SD, 2015

- Flood Insurance Study, Woodbury County Iowa and Incorporated Areas, Federal Emergency Management Agency, 2011

- Estimation of Flood Flows on the Big Sioux River between Akron, Iowa and North Sioux City, South Dakota, U.S. Geological Survey Water-Resources Investigations Report 96-4121, 1996

- Big Sioux River at Sioux City Iowa and South Dakota, Design Memorandum No. MS-15, Flood and Erosion Protection Project, U.S. Army Corps of Engineers, 1973

- LiDAR data sets or digital elevations models for counties in the Big Sioux River Basin

- Previous hydrologic and hydraulic studies have been conducted in parts of the basin and may be useful for this study. The contractor should contact the appropriate entities to obtain any data that may be pertinent to this project.

- Historic lake level data for Lake Kampeska and Lake Poinsett are available from DENR at the following location: https://apps.sd.gov/NR65LakeInfo/public.aspx.

The RFP Point of Contact is available to meet in person or by webinar with interested parties upon request to answer questions about this RFP and the expected outcomes of the project.

SCOPE OF WORK

The contractor will be expected to gather and analyze data necessary to produce an accurate hydrologic and hydraulic model of the Big Sioux River Basin. The area that will comprise the model for this project is shown in figure 1. A digital file representing this boundary is available from the RFP Point of Contact. Changes to the study area boundary may be negotiated between the contractor and DENR.

Significant guidelines for the model are:

- The model should account for precipitation and runoff events.

- The June 2014 flood event in the lower Big Sioux River Basin should be included as a calibration event for the model.

- The model should use the Akron, IA streamgage, the North Sioux City streamgage, and other pertinent streamgages in the model calibration.

- The model should account for the impact of terrain differences on river hydraulics. For example, at Richland, SD the relatively narrow Big Sioux River valley merges with the much larger Missouri River valley. Beginning at this point, the Big Sioux River flows in the Missouri River valley until its confluence with the Missouri River. The 2014 flood event showed that this terrain change has significant impacts on river elevations and flows in the lower basin. The model should be able to predict these impacts.

- The model will account for variable flows in the Missouri River at the confluence. During the 2014 flood event the U.S. Army Corps of Engineers significantly lowered the discharge from Gavins Point Dam near Yankton. This resulted in much lower Missouri River flows at the confluence and most likely impacted inundation levels. The model should be able to adjust its output based on flows in the Missouri River.

- The model will accurately predict river elevations and discharge for a range of flood events at critical points in the model area. Final location of critical points will be negotiated with the selected contractor and may include the following sites, which are shown in figure 2.

    1. Lake Kampeska inlet/outlet area
    2. Watertown at 3rd Avenue NW
    3. Watertown at Highway 212
    4. Castlewood at Highway 22
    5. Lake Poinsett inlet/outlet area
    6. Bruce at 203rd Street
    7. Brookings/Moody County line
    8. Flandreau at Highway 13
    9. Egan at 233A Street
    10. Trent at 240th Street
    11. Dell Rapids at Highway 115
    12. Baltic at 250th Street
    13. Renner at 258th Street
    14. Sioux Falls at Skunk Creek confluence
    15. Sioux Falls at Cliff Avenue
    16. Brandon
    17. Canton
    18. Hawarden, IA
    19. Akron, IA
    20. Richland
    21. Jefferson Bridge
    22. North Sioux City

The main products that will be delivered from this project are described as follows:

1. The contractor will deliver a calibrated, working model that DENR will be able to use for future flood analyses, including creating inundation maps for various flow scenarios. The model will be used as the basis for flood inundation mapping described in item #2 below. The model will be developed using HEC-RAS 5.0 modeling software.

   The Federal Emergency Management Agency (FEMA) is currently conducting a study that includes all South Dakota counties in the Big Sioux River Basin for the purpose of updating flood maps. The FEMA study area encompasses a subset of the area defined by

this RFP and may not generate information in as much detail as is needed for this study. A preliminary HEC-RAS 5.0 2D model generated by the FEMA study will be available for this study in the fall of 2016. The contractor in this study will use that model as a base starting point and build more detail into it as necessary.

2. The contractor will develop a web-based application that will display inundation on a base map for various flows in the Big Sioux River at Watertown, Sioux Falls, Brandon, Canton, and North Sioux City. The application will include the ability to adjust flows on critical tributaries such as Skunk Creek at Sioux Falls, Beaver Creek near Canton, Willow Creek at Watertown, Split Rock Creek and Beaver Creek near Brandon, and the Missouri River at the confluence. Final inundation mapping areas and tributaries with flow adjustment will be negotiated between the selected contractor and DENR. A geodatabase containing feature classes of inundation polygons for the sites agreed upon should be made available to DENR. The application should allow the user to introduce variables such as new levees, raised roads, or breached structures. New model output should automatically be generated to account for the impact of these variables on inundation. An example of the type of application this project should produce can be seen in the Inundation Maps section of the Iowa Flood Information System. An example of the inundation mapping capabilities of this system is shown in figure 3. The Iowa Flood Information System can be accessed at http://ifis.iowafloodcenter.org. The web application should be designed so that access can be restricted to authorized users only.

The timeframe under which the work for this project will be performed will be no more than 3 years. The contractor shall submit quarterly project reports to DENR.

REQUEST FOR PROPOSALS

The following is a list of activities and estimated timelines relevant to the RFP process:

- RFP Posting – May 6, 2016.
- Proposals due – June 3, 2016.
- Contractor selection – August 2016.
- Contract execution – September 2016.

Proposal Contents

Proposals shall be prepared and submitted in such form as specified below. Each page shall be numbered. The proposal should provide a concise description of the respondent's ability to meet the requirements of this RFP. Information the respondent considers to be proprietary information should be identified as such. However, DENR reserves the right to determine if the information is public.

Proposals which in the judgment of DENR fail to meet the requirements of this RFP, or which are in any way incomplete, conditional, or which contain additions or deletions not called for,

alterations or other irregularities, or in which errors occur, may be rejected at DENR's discretion. DENR reserves the right to waive any requirements of or informalities in any proposal or to reject any or all proposals if it determines that it is in DENR's best interest to do so.

Respondents should submit a complete response to all the required elements of the RFP as described below.

1. *Transmittal Letter* – Each respondent shall prepare a transmittal letter summarizing the principal points in the respondent's proposal. The letter must be signed by the representative who would serve as the primary contact for this contract and include that person's mailing address, telephone number, fax number and email address. The firm's federal tax identification number should also be included.

2. *Experience* – Describe the respondent's experience and capabilities as well as any proposed subcontractor's experience and capabilities. Emphasis should be placed on knowledge of hydrologic and hydraulic modeling, as well as knowledge of designing web-based applications, generally, and inundation mapping web tools, specifically.

3. *Project Team* - Identify the members of your firm as well as any proposed subcontractors that will participate in the completion of these services. The use of a subcontractor(s) to increase the effectiveness of the respondent's proposal is allowable.

4. *Compensation* – Provide a detailed description of the proposed compensation basis or structure including the categories of personnel, travel, equipment, supplies, and contractual services.

CRITERIA AND PROCESS FOR SELECTION

Proposals will be evaluated in light of the following criteria:

- Experience, specialized expertise, capabilities, and acceptable cost effective performance history in building hydrologic and hydraulic models over medium to large watersheds (25 points)
- Familiarity with, and experience in, projects that analyze the hydrologic and hydraulic characteristics of the Big Sioux River Basin (20 points)
- Experience and proven ability to integrate modeling outputs into a web-based inundation mapping tool (20 points)
- Personnel and corporate resources committed to the project and availability to the project locale (15 points)
- Proposed methodologies, techniques, project management, and overall responsiveness and clarity of the proposal (10 points)
- Compensation (10 points)

This is not a competitive bidding invitation. An evaluation committee, which will include staff from the state DENR, Office of Emergency Management, Department of Transportation, and Bureau of Information and Telecommunications, will review the submittals. At the discretion of the committee, some candidates may be selected to make oral presentations to the committee. The committee will make a recommendation to DENR and final selection will be made by DENR.

TERMS AND CONDITIONS

- DENR will make the final determination regarding the selection of the respondent.
- DENR reserves the right to reject any and all proposals.
- DENR will negotiate the compensation and hire the successful respondent.
- If DENR is not able to successfully negotiate a contract with the highest ranked respondent, negotiations shall cease. DENR shall then begin negotiations with the second highest ranked respondent. This process may continue until negotiations are successful.
- The successful respondent may not subcontract with any firm not identified in its RFP without the prior, written consent of DENR.
- All respondents will be notified in writing of the selection.

STATE NOT LIABLE FOR EXPENSES OF PROPOSALS

DENR shall not be liable for any expenses incurred by any respondent in preparing or presenting the proposal.

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION – LOWER TIER COVERED TRANSACTIONS

By signing and submitting this proposal, the offeror certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation, by any Federal department or agency, from transactions involving the use of Federal funds. Where the offeror is unable to certify to any of the statements in this certification, the bidder shall attach an explanation to their offer.

NON-DISCRIMINATION STATEMENT

The State of South Dakota requires that all contractors, vendors, and suppliers doing business with any State agency, department, or institution, provide a statement of non-discrimination. By signing and submitting their proposal, the offeror certifies they do not discriminate in their

employment practices with regard to race, color, creed, religion, age, sex, ancestry, national origin or disability.

MODIFICATION OR WITHDRAWAL OF PROPOSALS

Proposals may be modified or withdrawn by the offeror prior to the established due date and time.

No oral, telephonic, telegraphic or facsimile responses or modifications to informal bids, formal bids, or Request for Proposals will be considered.

PROPRIETARY INFORMATION

The proposal of the successful offeror(s) becomes public information. Proprietary information can be protected under limited circumstances such as client lists and non-public financial statements. Pricing and service elements are not considered proprietary. An entire proposal may not be marked as proprietary. Offerors must clearly identify in the Executive Summary and mark in the body of the proposal any specific proprietary information they are requesting to be protected. The Executive Summary must contain specific justification explaining why the information is to be protected. Proposals may be reviewed and evaluated by any person at the discretion of the State. All materials submitted become the property of the State of South Dakota and may be returned only at the State's option.

GOVERNING LAW

Venue for any and all legal action regarding or arising out of the transaction covered herein shall be solely in Circuit Court, Sixth Judicial Circuit, Hughes County, South Dakota. The laws of South Dakota shall govern this transaction.

PROPOSAL DUE DATE AND CONTACT FOR INFORMATION

The RFP Point of Contact is:

Tim Cowman, Natural Resources Administrator
SD Department of Environment and Natural Resources
414 East Clark Street
Akeley-Lawrence Science Center
Vermillion, South Dakota 57069
Email: tim.cowman@usd.edu
Phone: 605-677-6151

Six (6) hard copies of the respondent's proposal should be submitted to the RFP Point of Contact by 5:00 P.M., Central Time, on or before June 3, 2016. Additionally, please email a PDF of your proposal to the RFP Point of Contact on or before the submittal deadline. Questions regarding this RFP may be directed to the RFP Point of Contact via email or by phone.

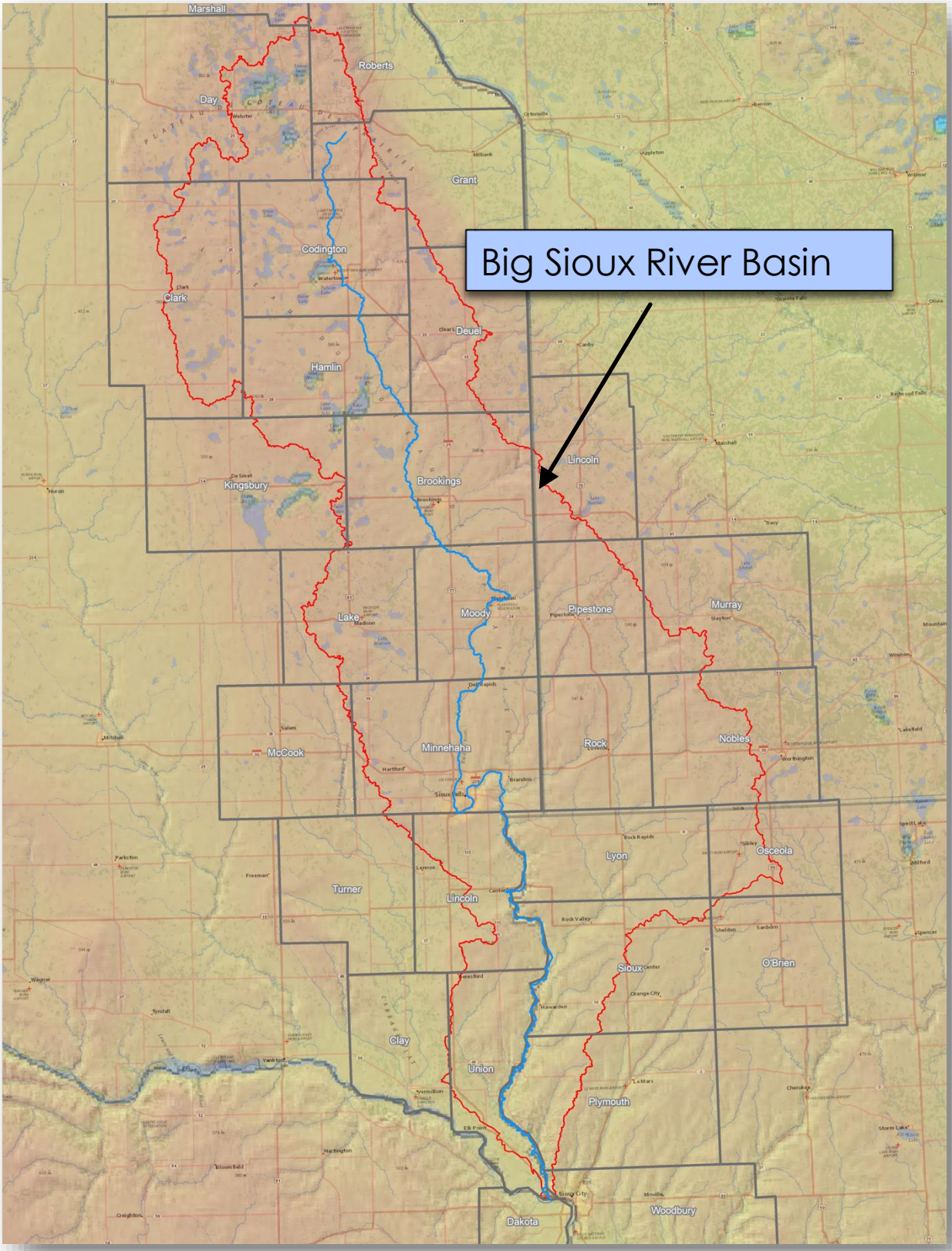

Figure 1. Model study area shown inside red polygon.

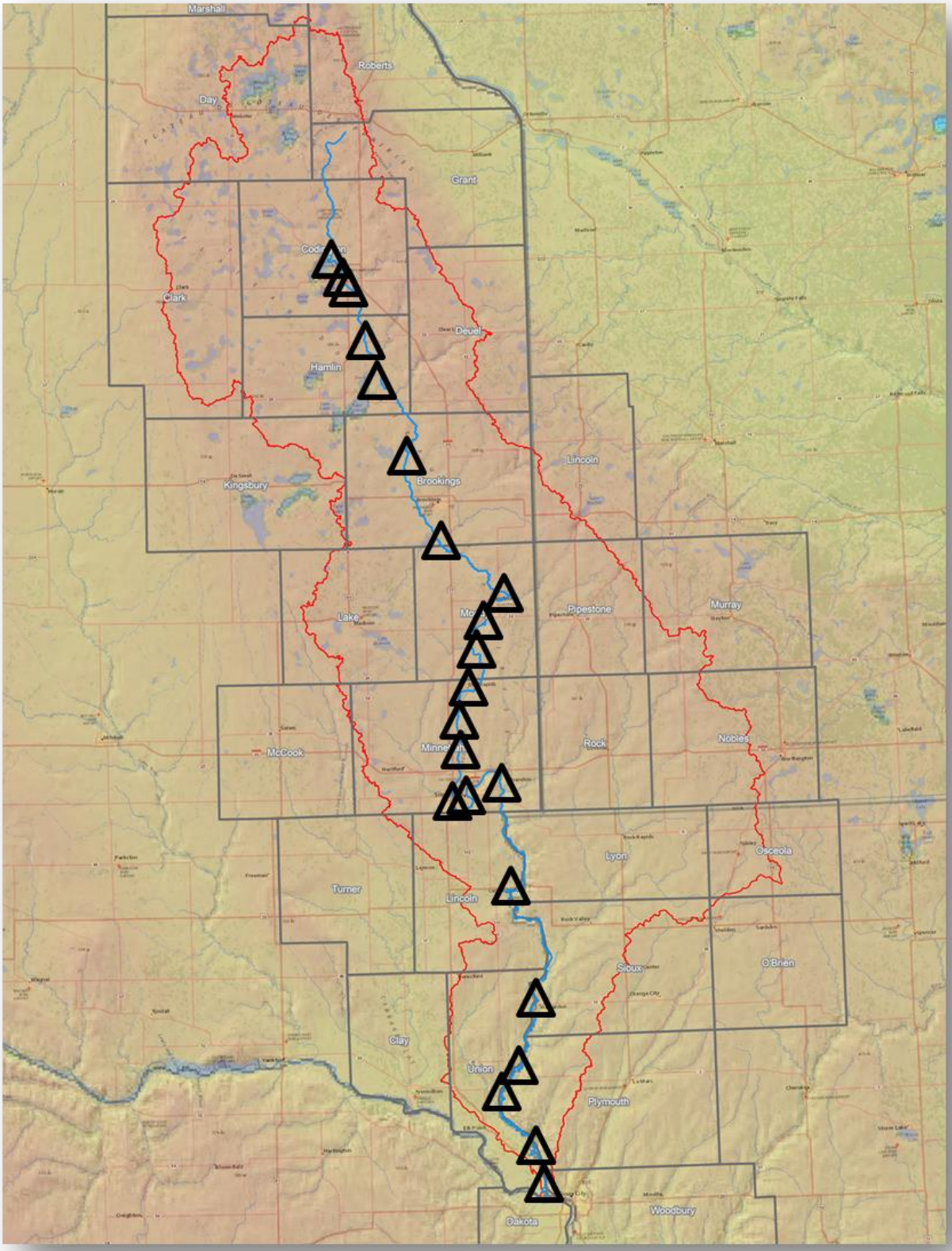

Figure 2.Example locations where river elevations and discharge rates will be modeled.

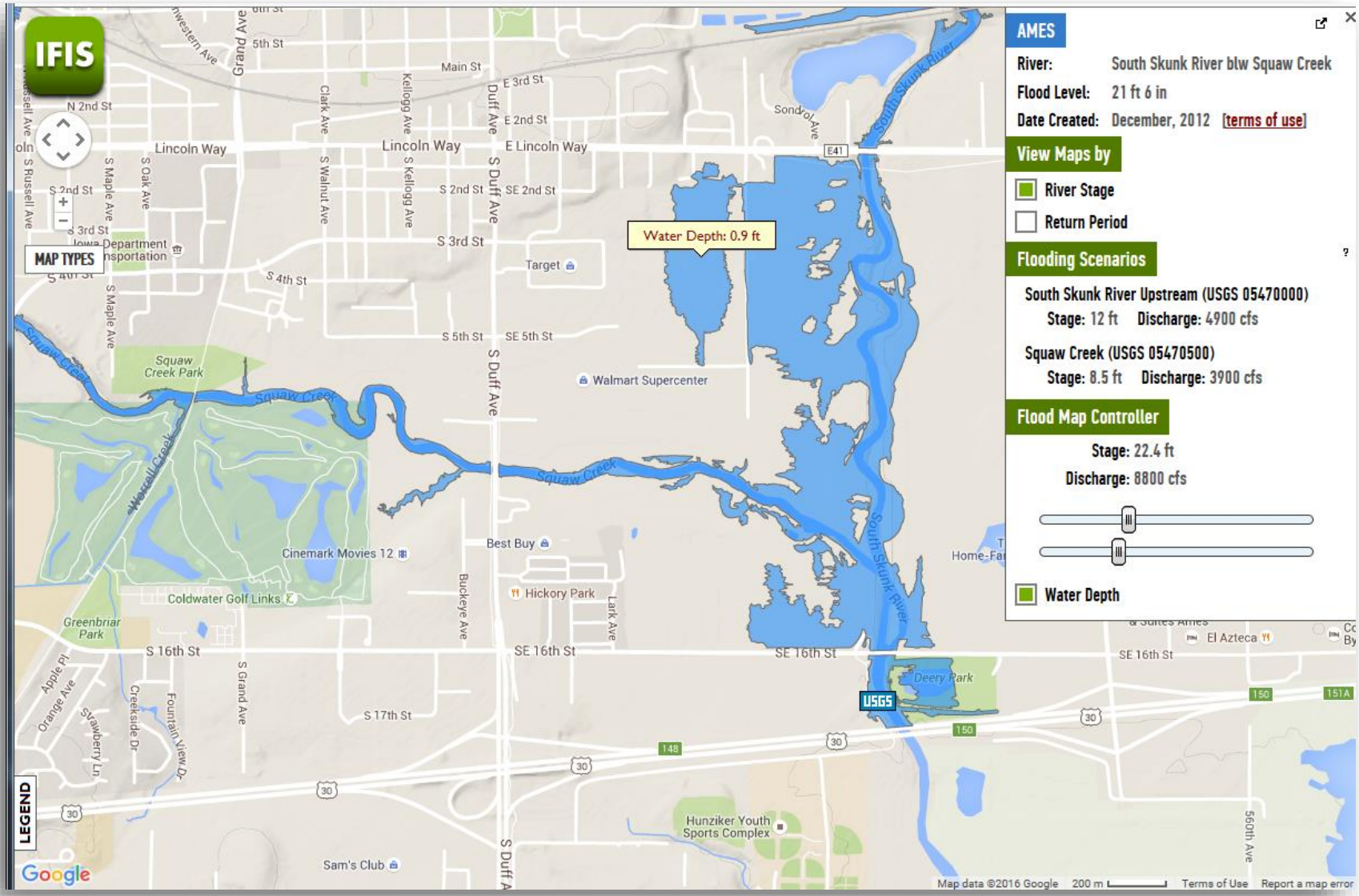

Figure 3. Example of flood inundation from Iowa Flood Information System.