Shippensburg University Cooperative Ecosystem Studies Unit Cooperative Agreement
National Park Service, Upper Delaware Scenic and Recreational River

Develop a GIS spatial decision support tool in support of the Upper Delaware Scenic and Recreational River substantial conformance and project review mandate, and aid in resource stewardship activities in the region.

The practical flow of work may indicate that certain Objective elements may need to be addressed outside of the order presented. Objectives 1-3 to be accomplished during Agreement Years 1-3; Objective 4 to be accomplished between Agreement Years 2-5.

Objective 1
Collect, process, and create web services for data identified as essential components of UPDE's project review GIS. This will entail acquiring updated data and completing preparation efforts that have already been initiated by the NPS, as well as preparing other data layers that have not yet been tackled or have yet to be identified.

- Evaluate spatial zoning data obtained from town/ships and counties with respect to current official town/ship zoning maps. Update the spatial data to ensure its accuracy and completeness, and work with partners to create new shapefiles for locations that are still missing spatial data (likely one or two municipalities).
- Review town/ship zoning documents to identify overlay districts, and perform a concurrent evaluation of their representation in zoning maps/shapefiles. Assist the NPS in creating a plan to rectify discrepancies identified.
- Obtain updated parcel data from UPDE counties, and process these for inclusion in the webmapping application. Required processing steps may include stripping out all attributes except for the unique ID used by the counties (to remove possible personally identifiable information), and/or including a link in the attributes to county tax map websites to facilitate research on parcel characteristics and history.
- Obtain updated E-911 point address data from UPDE counties, and process these for inclusion in the webmapping application. This will likely entail standardizing information from different counties for consistent presentation in the webmapping application.
- Assess suitability of the US Census Bureau roads and rails web feature services currently used in the webmapping application. If necessary, identify alternative sources for these data and collect and process them for inclusion in the system.
- Obtain and process USGS soil shape and attribute data from the SSURGO database. Create an attribute based on the soil k-factor score that serves as an intuitive proxy for erodibility that is consistent with information needs outlined in the RMP.
- Work with NPS personnel to identify additional data of interest not currently in the webmapping application (e.g., gas pipelines, trails, river islands, river access points, etc.), and carry out necessary collection, processing, and service creation or identification steps for these layers.
- Evaluate pros and cons of hosting web feature services directly on ArcGIS Online versus hosting on NPS public servers maintained by the Denver Service Center. Using this information, assist NPS personnel in making a final decision on the best hosting solution for the project review GIS.
- Optimize the FEMA flood hazard data in the webmapping application by evaluating suitability of current web feature services provided by FEMA, troubleshooting the existing service created by the NPS for the prototype system, and/or setting up a new service.
- Enhance the slope data service currently used in the webmapping application for optimal speed and usability. If needed, obtain, process, and create a new service for slope data from an alternative source.
- Examine and make necessary changes to other web feature services currently used in the prototype webmapping application.
- Re-project any processed datasets into a common coordinate system (NAD83 UTM Zone 18N), populate their metadata (ensuring FGDC compliance if the layer will be redistributed as a NPS data product), and securely deliver in a file geodatabase to the NPS via electronic transfer.
- Document data sources, actions, and relevant metadata in a master data dictionary.

Objective 2: Application

Complete development of a webmapping application for UPDE's project review GIS. This will involve evaluating the prototype application and associated webmap that have been created in ArcGIS Online using Web AppBuilder, including assessing their

functionalities and identifying their deficiencies. The application and webmap will then need to be updated and optimized to ensure the system meets the intended users' needs.

Work with users from the NPS and UDC (i.e., via an in-person workshop, phone interviews, or electronic surveys) to evaluate usability of the prototype system. Identify information needs or system functionalities that are not currently being met with the existing webmapping application.

- Enhance the underlying webmap that is used by the prototype application. This may include making improvements to data layer symbologies and scale dependent visibilities, along with optimizing data layer hierarchy and organization.
- Configure attribute pop-up settings for data in the webmap and application, including confirming suitability of current settings, and configuring settings for new data layers.
- Optimize the application appearance by revisiting widget icons and arrangements, basemap selections, and default configurations, among others.
- Set up appropriate attribute table displays in the webmapping application so that browsing and selecting table records is easy and straightforward. This will entail working with NPS personnel to identify relevant fields and setting up meaningful aliases.
- Revisit functionality requirements identified from the needs assessment, and evaluate the ability of the prototype to fulfill these. Enhance functionality of the webmapping application as needed by incorporating new widgets or reconfiguring existing ones.
- Assist the NPS in determining security needs for the whole webmapping application and/or specific data layers. Implement these measures in the final system (i.e., by including password protection, or making certain services available only to select users).
- Develop a protocol for uploading data to the system and creating or adding web services to the webmap and application.
- Develop a schedule for acquiring updates in zoning, etc. from county level, as well as towns and township partners at least annually.

Objective 3: Implementation
Key to the success of this project is its attractiveness and ease of use by the novice user. Frequency of change in elected officials dictates an ongoing need to work with novice users of the system. Therefore, the third objective is implementation and it must include:

- Facilitate a written plan for rollout including assistance to NPS with instruction and support of the GIS tool and its relationship to the requirements of the Upper Delaware Act and Guidelines.
- Development of written Instructions and technical support of NPS and Upper Delaware Council staff in use and maintenance needs of the system.
- Participation in public meetings to "roll out" the project among local, county and state agency partners with responsibility for implementing the project review process.
- In-person roll out workshop to introduce and instruct users on use of the tool. Participants to include partners involved in implementing the project review process.

Objective 4: Maintenance
Maintain UPDE's project review GIS system so that it remains up to date and relevant.   It is anticipated *that this element will be undertaken during each of years 2-5 of this agreement*. This requires the development of a maintenance plan, assigning upkeep responsibilities to different stakeholders, and scheduling a means to check-in with end users on a periodic basis. Required aspects include:
- Maintain the system, including making required changes to service .urls, and checking and maintaining performance and settings in in the webmap and application (ArcGIS Online).
- Update satellite imagery and topographic base maps when available, keeping them as up to date as possible.
- Help schedule and facilitate annual "users group" meeting(s) with town/ships, Upper Delaware Council, and National Park Service.
- Develop a written maintenance plan for keeping the component data of the system current, including a written schedule of execution for updates, additions, deletions, and data QA/QC considerations. This maintenance plan should be suitable for execution by novice to intermediate GIS users.