TASK 1: COMPILE AND EVALUATE EXISTING INFORMATION

The primary objective of this task is to compile and organize existing historical information on the hydrology, biology and physical habitat, physical processes (geomorphology), and water quality of the study area. An appropriate data management plan is necessary to ensure data integrity.

Objective 1.1: Develop data management and integrity protocols for documenting data sources and data quality. Draft a metadata (i.e., information about data) protocol for documenting and recording data sources and data quality information to accompany electronic databases.

Deliverable 1.1.A: Metadata protocol including tracking form

Deliverable 1.1.B: GIS data catalog including metadata profiles for all GIS layers

Objective 1.2: Compile and review historical information contained in reports and documents related to biology and physical habitat, hydrology, physical processes (geomorphology), and chemical processes (water quality, aquatic life uses, etc.) and published or located by the following sources:

- State of Texas agencies including TPWD, TCEQ, TWDB or predecessor agencies;
- Federal agency reports including those produced by U. S. Geological Survey (USGS), U. S. Fish and Wildlife Service, U. S. Bureau of Reclamation, and U. S. Army Corps of Engineers;
- River Authority and Water Districts (including Clean Rivers Program Assessments and reports written by contractors);
- University studies of the river in question; and
- Journal articles referenced in the following online databases:

    - Applied Science and Technology Abstracts,
    - ASFA (Aquatic Science & Fisheries Abstracts),
    - BIOSIS - Biological Abstracts, Dissertation Abstracts,
    - Pollution Abstracts,
    - Water Resource Abstracts.

Deliverable 1.2.A: An annotated bibliography of existing studies including a matrix summarizing data types by study

Deliverable 1.2.B: Relevant data will be migrated to electronic format

Objective 1.3: Review and summarize existing hydrologic data sets including: discharge measurements from special studies; cross section locations and profiles; USGS gage locations, period of record, discharge data, and rating curves; impoundment locations and size; reservoir discharge and/or level data; reservoir operating rules and reservoir systems operations; data on groundwater-surface water relationships; water right diversion locations and amounts; and water right return flow locations.

Deliverable 1.3.A: GIS layers of hydrologic data including gage locations, cross-section locations, and reach or segment locations from previous instream assessments

Deliverable 1.3.B: Metadata summary for each data source and each data layer

Deliverable 1.3.C: Database of discharge data and existing rating curves in electronic formats appropriate for use by the interagency science team

Deliverable 1.3.D: Preliminary statistical analysis of patterns of flow (e.g., base flow, means and medians, minima and maxima) and flow modification (e.g., ramping rates, hourly, daily, monthly and annual flux) and recommendations for flow windows for data collection. Summary report describing the hydrologic network.

Objective 1.4: Summarize location and results of existing physical habitat assessments, if any, within the study area. This information should include a spatial (longitudinal) assessment of substrate composition and distribution of significant (stable) habitat features such as riffles, runs, rapids, waterfalls, bedrock outcrops, dams, channel dams, weirs and low-water crossings, and other significant features; as well as longitudinal and cross-sectional profile data. Identify existing sources for historical aerial photography, videography, or other high-resolution (1-10m) imagery of the study area.

Deliverable 1.4.A: Matrix of data types available from specific studies

Deliverable 1.4.B: GIS layers containing location of physical habitat assessments, habitat features, mesohabitat summaries, and geo-referenced imagery where available

Deliverable 1.4.C: Metadata summary for each data source and each data layer

Deliverable 1.4.D: Database of habitat data, profiles, etc. in electronic formats appropriate for use by interagency science team

Deliverable 1.4.E: Summary report on previous habitat assessments to include an evaluation of past assessment protocols

Objective 1.5: Summarize biological data for fish, other aquatic vertebrates, and benthic communities (including invertebrates, mussels, algae, aquatic macrophytes, etc.) collected within the study area. Fish and benthic invertebrate collection records from water quality, instream flow, research, and taxonomic studies or surveys will be summarized into data products and GIS data layers. Information on life history traits (e.g., spawning season and needs, foraging traits, etc.), environmental requirements (e.g., habitat, temperature, dissolved oxygen), species distributions, community composition, and connectivity considerations (e.g., migration, floodplain and hyporheic habitat, etc.) shall be summarized. Summarize biological data on riparian and other wetland resources.

Deliverable 1.5.A: Matrix of biological data types available from specific studies

Deliverable 1.5.B: Species lists for study reaches from all sources, arranged in chronological order and organized by reach/ locations within the watershed

Deliverable 1.5.C: GIS layers containing location of biological collections and species lists

Deliverable 1.5.D: Metadata summary for each data source and each data layer

Deliverable 1.5.E: Database of presence/absence data, abundance data, and community measures wherever possible, in electronic formats appropriate for use by interagency science team

Deliverable 1.5.F: Summary report on biological assessments or other previous work to include a literature review of life history traits, environmental requirements, species distributions, community composition, and connectivity considerations

Deliverable 1.5G: Summary report on spatial attributes and characteristics of riparian and other wetland resources

Objective 1.6: Summarize physical processes (geomorphology) data related to sediment transport, erosion and deposition, substrate and cover characteristics, and channel patterns. These datasets should include watershed and floodplain land use/land cover, elevations (from DEMS, NED, LIDAR), slope, sediment type (spatial observations and geologic records), aquifer characteristics, and locations of springs and wells. Also required are assessments of riparian vegetation (size, age, native/introduced species, spatial distribution and proximity to main channel) and substrate. Historical aerial photos must be compared with recent photos in order to elucidate changes in river meanders, areas of sediment deposition/scour and any changes in floodplain characteristics over time. Channel patterns may be quantified by calculating curvature and the river length:straight-line distance ratios.

Deliverable 1.6.A: Matrix of geomorphological data types available from specific studies

Deliverable 1.6.B: GIS layers containing location of geomorphological issues

Deliverable 1.6.C: Metadata summary for each data source and each data layer

Deliverable 1.6.D: Database of substrate and cover characteristics, in electronic formats appropriate for use by interagency science team

Deliverable 1.6.E: Summary report on geomorphological assessments and other previous works related to identifying flows for channel maintenance and sediment transport and flushing.

Objective 1.7: Summarize water quality data.

Deliverable 1.7.A: Matrix of water quality data types available from specific studies

Deliverable 1.7.B: GIS layers containing location of water quality issues

Deliverable 1.7.C: Metadata summary for each data source and each data layer

Deliverable 1.7.D: Database of water quality characteristics, in electronic formats appropriate for use by interagency science team

Deliverable 1.7.E: Summary report on water quality assessments and other previous works related to identifying flows for maintaining water quality requirements for fish and wildlife.