GUNNISON BASIN
STREAM MANAGEMENT PLAN PROCESS

Prepared for:

The Gunnison Basin Roundtable

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Stream Management Plan Process

Introduction

The Gunnison Basin Implementation Plan (GBIP), overseen by the Gunnison Basin Roundtable (GBRT), was finalized in April 2015. The GBIP identified the need to prepare stream management plans for the major basin tributaries. With remaining available funding, the GBRT directed the development of a Stream Management Plan Process that includes a **Quick Start Guide** that identifies data requirements and sources, funding opportunities; and a **Draft Scope of Work** that can be used as additional funding becomes available. To assist with future stream management plans, Google Earth projects were developed for the larger tributaries that provide map-based links to relevant information available from State sources including ditch diversion records and water rights, irrigated acreage, reservoirs, streamflow information, and instream flow reaches. These projects can be accessed using the free Google Earth application. Google Earth projects were developed for the following major tributaries basins:

- North Fork Gunnison river (North_Fork_SMP_Data.kmz)
- Ohio River (Ohio_SMP_Data.kmz)
- Tomichi River (Tomichi_SMP_Data.kmz)
- East River (East_SMP_Data.kmz)
- Cimarron River and Lake Fork (Cimarron_LakeFork_SMP_Data.kmz)
- Uncompahgre River (Uncompahgre_SMP_Data.kmz)
- Tributaries of the Grand Mesa (Grand_Mesa_SMP_Data.kmz)

This document also includes a **Google Earth Tips** section that provides guidance for accessing and querying the Google Earth projects.

1. Stream Management Plan - Quick Start Guide

Introduction

This guide was developed for the Gunnison Basin Roundtable (GBRT) as part of the Gunnison Basin Implementation Plan process. It provides a simple collection of information that may be useful for the development of potential future Stream Management Plans (SMPs). It is designed to serve as a starting point for entities interested in pursuing a SMP. Numerous other tools and resources beyond what is listed will be necessary to successfully implement a SMP. To the extent possible, the items listed in this document include an active hotlink (updated 7/21/16). In addition to this document, a draft scope of work template was developed for the GBRT to help inform prospective SMPs.

Best Place to Start:

- Colorado Water Trust Stream Management Workshop at 2016 Colorado Water Congress Summer Conference – Forthcoming event to: "address Stream Management Plans (SMPs), what they are, how to do them, who has done them, and what you need to do get one up and running in your watershed." May include subsequent associated material to be developed.
- CWCB Nonconsumptive Toolbox – Existing guidance and resource document to address nonconsumptive needs and implement nonconsumptive projects. Among other things, many useful appendices include: summary of tools for project planning, roundtable nonconsumptive mapping, a summary of funding opportunities (with hotlinks), a summary of existing nonconsumptive programs, etc.
- Colorado Water Plan – Includes description and information on stream management plans (pages 6-168 to 6-169)

Data/Mapping:

- CDSS Tools – Collection of online and downloadable tools developed by the State of Colorado to provide a comprehensive water management system. Contains the official HydroBase data records for water use and administration throughout Colorado. Useful for querying water rights, diversion structures, gaging stations, etc. Includes downloadable GIS data.
- DWR Map Viewer – recently updated online mapping interface that interactively displays HydroBase data (e.g. water rights, diversion structures, gaging stations, wells, irrigated acreage, etc.). Note, the FAQ list on the hotlinked launch page for the application includes links to useful YouTube instructional videos.
- Nonconsumptive Needs Assessment Focus Mapping Final Report and Appendices – Final report with summary information and background material on the nonconsumptive needs identification and mapping process performed by each of the basin roundtables. Underlying data is available upon request from the Colorado Water Conservation Board.
- Google Earth Pro – Free mapping software with seamless aerial imagery and the ability to incorporate any other GIS layers (e.g. HydroBase data, topo maps, etc.). Useful for low cost data display.

- USGS StreamStats – Updated and user-friendly online tools for watershed delineation and statistical analysis of flow characteristics.
- Water Quality Portal – A cooperative service sponsored by USGS, U.S. Environmental Protection Agency (EPA), and National Water Quality Monitoring Council that integrates publicly available water-quality data from the USGS National Water Information System (NWIS) database and the EPA STOrage and RETrieval (STORET) data warehouse.

Examples of Existing and Ongoing SMP Efforts in Colorado (Scopes, Funding Applications, Reports):

- Mancos River Diversion Project, Phase 1 (November 2009)
- Grand County Stream Management Plan, Phase 3 (August 2010)
- Mancos River Habitat and Diversion Project – Phase 2 (March 2013)
- Crystal River Management Plan (April 2016)
- San Miguel River Stream Management Plan Pilot Project (ongoing, CWCB WSRA funding approved January 2016)
- Colorado Basin Roundtable Integrated Water Management Planning Framework (ongoing, CWCB WSRA funding approved January 2016)
- North Fork of the Gunnison Environmental/Recreation and Irrigation Infrastructure Assessment and Planning – (ongoing, CWCB WSRA funding approved March 2016)
- Mancos River Habitat and Diversion Project – Phase III – (ongoing, CWCB WSRA funding approved March 2016)

Funding

- Nonconsumptive Toolbox, Appendix E – List of numerous local, state, federal, and private funding opportunities with brief description and hotlinks.
- Colorado Watershed Restoration Grant Program
- Fish and Wildlife Resources Fund Grant Program
- Water Supply Reserve Account Grant (WSRA) Program

2. Stream Management Plan – Scope of Work Components

Introduction

This document was developed for the Gunnison Basin Roundtable (GBRT) as part of the Gunnison Basin Implementation Plan process. It seeks to provide a summary of potential items and tasks that may be included in the scope of work for a Stream Management Plan (SMP). By pulling information from numerous completed and ongoing SMPs it is designed to serve as a simple starting point for SMP development by providing a menu of options for how to structure an appropriate scope of work. As such, it is not an exhaustive reference on stream management planning. Numerous other tools and resources beyond what is listed will be necessary to successfully implement a SMP. In addition to this document, a Stream Management Plan Quick Start Guide was developed for the GBRT to help inform prospective SMPs.

While relatively new to Colorado and still an evolving concept, SMPs provide an opportunity to collaboratively address various challenges. SMPs are inherently driven by local issues and require close coordination at every step between traditional consumptive water users (i.e. agriculture and municipal users) and environmental and recreational interests. By incorporating diverse interests in the community, SMPs seek to achieve multiple mutual benefits within the context of existing water rights administration. For example, multiple parties may seek joint funding for improved agricultural diversion infrastructure that improves agricultural efficiency while leaving more water in the stream. While the SMP approach is different from traditional watershed planning, it builds on the foundation and data from previous planning efforts. To maximize their effectiveness, SMPs focus on well-defined, limited stream reaches to pinpoint challenges along with discrete, achievable solutions. There are numerous potential components and approaches to stream management planning, but all efforts ultimately seek to identify the best locally-supported solutions to maintaining and improving flows via the input and assistance of traditional consumptive water users.

Scope of Work Components

The following list includes various components and tasks that may be included in a SMP. The list is not all-inclusive, and is not laid out in a particular sequential order or priority. It is also important to keep in mind that SMPs can take many forms. In some areas, a thorough biological, hydrological and geomorphological assessment may be desired, while other areas may focus more on potential project identification or addressing known hotspots (e.g. dry-up points related to diversion infrastructure that may benefit from investment and rehabilitation). The list seeks to identify the primary items that a scope of work for a potential SMP may address.

- **Reach Identification** – Prior to initiating the project, it may be helpful to have project proponent(s) identify the appropriate stream reach to be addressed by the SMP with the input of local water interests. The reach may choose to focus on a mainstem and/or certain tributaries, with well-defined boundaries (e.g. per confluences or stream miles).

- **Coordination Meetings with Local Interests** – Meetings should include as many known water interests within the identified stream reach as possible. Ideally represented interests would include all types of water uses and major organizations, ditch companies, etc.
- **Resource Inventory** – Compilation and review of available data, reports, plans, and relevant scientific literature. This would include any planning efforts, studies, etc. performed in the identified area, as well as pertinent and transferable scientific information from other areas, resulting in an understanding of existing environmental and recreational attributes.
- **Hotspot Identification** – An initial identification of known problems can help guide the SMP process. While some challenges and constraints may be obvious, others may not be known to various parties involved in the SMP. As much as possible, it is important to understand existing water uses, efficiencies, and shortages.
- **Projects and Methods Identification** – Any known projects or management options that have been considered within the reach may be evaluated for their inclusion in the SMP. This could include information from the recently completed Basin Implementation Plans, as well as any other watershed plans, ditch-company assessments, etc. This effort should examine all types of projects including agricultural infrastructure, channel modification, habitat improvements, riparian restoration, and flow enhancement opportunities. The SMP may also choose to more thoroughly inventory potential projects and/or the condition and efficiency of existing agricultural infrastructure within the reach. Such an analysis could highlight agricultural efficiency projects with mutual benefits to producers as well as streamflows.
- **Hydrologic Analysis** – An analysis of streamflows using available gage data and/or modeling to simulate historical and future flows under variable conditions is necessary to understand the existing and desired flow regime. Numerous modeling platforms and approaches may be employed. Modeling at a daily time step is encouraged to provide an appropriate level of detail. Modeling can provide simulations of flow under natural and existing conditions, as well as variable hydrologies, such as the impacts of major drought and flood events.
- **Ecological Risk Analysis –** Various tools can be employed to statistically examine ecological risk of various flow thresholds within the identified reach. For example, the Indicators of Hydrological Alteration software program was developed by scientists at The Nature Conservancy and has been successfully employed in Colorado. Depending on the nature of the analysis it may require simulated streamflows from hydrologic modeling.
- **Habitat and Geomorphological Assessments –** This may include an analysis of water quality, temperature, fish populations, riparian vegetation, and macroinvertebrates, along with habitat evaluations using methods such as R2Cross or the Rosgen Stream Classification System. In addition, it may be helpful to model sediment mobilization and resulting impacts to channel stability and vegetation.
- **Analysis of Recreational Activity and Flow Preferences –** Any available survey data in the identified reach can provide a better understanding of recreational use, perhaps combined with additional surveying. This can also be combined with information from American Whitewater on flow-based recreational preferences and recommended efforts to quantify boater days. In

addition, local angling interests (i.e. clubs and guiding services) can provide important information concerning flow preferences.

- **Documentation and Planning** – Regardless of the SMP's specific focus is it important to document the analysis performed, inputs considered, and resulting project and management recommendations. This will yield a planning document that is stakeholder-driven, detailing the identified issues, solutions, goals, and specific/prioritized actions to meet them. During the process, it is important to be data-driven and consider as many options as possible, including strategies related to market-based approaches, conservation, new supplies, and channel modification/restoration.

Colorado Water Plan – Stream Management Plans Section (Page 6-168)

The following language was pulled directly from the SMP section in the Colorado Water Plan (Pg. 6-168):

Well-developed stream management plans should be grounded in the complex interplay of biology, hydrology, channel morphology, and alternative water use and management strategies. They should also consider the flow and other structural or management conditions needed to support both recreational uses and ecosystem function. A stream management plan should:

1. *Involve stakeholders to ensure their acceptance of the plan;*
2. *assess existing biological, hydrological, and geomorphological conditions at a reach scale;*
3. *identify flows and other physical conditions needed to support environmental and recreational water uses;*
4. *incorporate environmental and recreational values and goals identified both locally and in a basin roundtable's BIP; and*
5. *identify and prioritize alternative management actions to achieve measurable progress toward maintaining or improving flow regimes and other physical conditions. For basin roundtables, local stakeholder groups, and decision makers, such plans can provide a framework for decision making and project implementation related to environmental and recreational water needs.*

The necessary steps for the development of a stream management plan include:

1. *Gathering stakeholders to participate in plan development;*
2. *identifying the plan's objectives;*
3. *identifying and prioritizing ecological and recreational values;*
4. *establishing goals for flows and other physical conditions in order to protect or enhance environmental and recreational attributes on streams and rivers within a given watershed;*
5. *collecting and synthesizing existing data describing flows for river ecosystems, boating, or other needs in the watershed;*
6. *assessing existing physical conditions of stream reaches, including geomorphological and riparian conditions;*
7. *selecting quantitative measures that can be used to assess progress made toward articulated goals;*

8. *determining what new information is needed and the best methods for obtaining that information;*
9. *quantifying specific numeric flow recommendations (or ranges of flow) and physical conditions and assessing the potential for channel reconfiguration to support environmental and recreational values;*
10. *identifying temporal, geographical, legal, or administrative constraints and opportunities that may limit or assist in the basin's ability to meet environmental and recreational goals; and*
11. *implementing a stakeholder-driven process to identify and prioritize environmental and recreational projects and methods. Stream management plans should provide data-driven recommendations that have a high probability of protecting or enhancing environmental and recreational values on streams and rivers.*

3. Google Earth Tips

Introduction
The following provides a quick guide and tips for using the Google Earth Projects developed to assist with future stream management projects.

- Click on any data point on the map or list ("My Places") for detail in the form of a data balloon;
- Data balloons include hotlinks to CDSS structure summaries (web browser must have popups disabled for DWR website);
- To zoom in:
    - Double-click a data point (map or list);
    - Use mouse wheel to scroll up;
    - Hold down right mouse button and pull mouse down (can also rotate left/right, or zoom out by pushing mouse up). This is the fastest method. Speed of zooming depends on how much you move the mouse up or down while holding the right button.
- To quickly restore view to a traditional map orientation (north up, without a 3D tilt), press "r" on keyboard. Pressing "n" restores north orientation only, while pressing "u" restores view angle to straight up (i.e. eliminates 3D tilt);
- Loaded kml files can be saved to "My Places" in Google Earth prior to closing the program to ensure that the layers are available every time the program is opened (automatically prompted);
- Individual data points and/or layers in "My Places" can be hidden by unchecking them in the list;
- The "Layers" list (bottom left) includes a number of useful pre-loaded layers that can be turned on/off (e.g. roads, borders and labels, etc.);
- Historical aerial imagery can be viewed by clicking the clock/arrow icon on the tool bar (top of map). Slide the bar on the scale that pops up to view available imagery (useful for a quick analysis of reservoir conditions through time);
- To measure distances/areas click the ruler icon on the tool bar;
- To always open to the same view, click the view menu/tab and "Make this my start location"