

Exhibit D

Guidelines for Regional Water Planning
Data Deliverables

March 2018

**Fifth Cycle of Regional Water Plan Development
(2017–2021)**

This document is subject to future revision based upon any future Legislative actions.

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Table of Contents

| | |
|---|-----------|
| Background | 7 |
| Purpose | 7 |
| 1 General Data Requirements | 7 |
| 2 Formats for Electronic Data | 8 |
| 2.1 Introduction | 8 |
| 2.2 File Formatting | 9 |
| 2.2.1 Accessibility | 9 |
| 2.2.2 PDF and MS Word Specifications | 9 |
| 2.2.3 Image formatting | 9 |
| 2.2.4 Correspondence Specifications | 9 |
| 2.2.5 Model Input Files | 9 |
| 2.3 File Structure | 9 |
| 2.4 GIS Data Requirements | 10 |
| 2.4.1 Metadata | 10 |
| 2.4.2 Projection | 11 |
| 2.4.3 Tabular Data | 11 |
| 2.4.4 ArcMap Documents | 11 |
| 2.4.5 Data Deliverables | 11 |
| 3 Data for Sources of Supply | 12 |
| 3.1 Source Status | 13 |
| 3.1.1 Existing Sources | 13 |
| 3.1.2 Future Sources | 13 |
| 3.1.3 Both Existing & Future Sources | 14 |
| 3.2 Water Quality | 14 |
| 3.2.1 Salinity | 14 |
| 3.2.2 Impacts to Source Availability | 14 |
| 3.3 Surface Water Source Type | 14 |
| 3.3.1 Run-of-River Source Subtype | 14 |
| 3.3.2 Reservoir Source Subtype | 15 |
| 3.3.3 Reservoir System Source Subtype | 17 |
| 3.3.4 Livestock Local Supply Source Subtype | 19 |
| 3.3.5 Other Local Supply Source Subtype | 19 |
| 3.3.6 Rainwater Harvesting Source Subtype | 20 |
| 3.3.7 Gulf of Mexico Source Subtype | 20 |
| 3.3.8 Atmosphere Source Subtype | 21 |
| 3.4 Groundwater Source Type | 22 |
| 3.4.1 Groundwater Source Subtype | 22 |
| 3.4.2 Aquifer Storage & Recovery Source Subtype | 24 |
| 3.5 Reuse Source Type | 25 |
| 3.5.1 Direct Reuse (Potable/Non-Potable) | 25 |
| 3.5.2 Indirect Reuse (Potable/Non-Potable) | 25 |
| 3.6 Conjunctively Used Sources | 26 |
| 3.7 Interregional Sources | 27 |

| | | |
|----------|--|-----------|
| 3.8 | Over-allocating Sources | 27 |
| 4 | Data for Entities | 27 |
| 4.1 | Entity Types..... | 27 |
| 4.1.1 | WUGs | 28 |
| 4.1.2 | WWPs | 29 |
| 4.1.3 | WUG/WWP | 29 |
| 4.1.4 | WUG/Seller | 29 |
| 4.2 | Entity Update Requests | 29 |
| 4.3 | Major Water Providers | 29 |
| 4.4 | Entity Primary Region | 30 |
| 4.5 | WUG Projection Data..... | 30 |
| 4.6 | Entity Existing Water Use & Sales Transaction Types..... | 30 |
| 4.6.1 | Direct Source Volume-In..... | 30 |
| 4.6.2 | Entity Sales/Transfers | 31 |
| 4.6.3 | Entity WUG Supply..... | 33 |
| 4.7 | Over-allocating Entity Supply..... | 34 |
| 4.8 | Existing Supplies Surface Water Interbasin Transfers | 34 |
| 4.9 | Entity Surplus | 34 |
| 4.10 | WUG Water Needs/Surplus | 34 |
| 4.11 | Use of Entities Module Data in WMS Module | 35 |
| 4.12 | Water Losses Related to Transferring Existing Supplies..... | 35 |
| 5 | Data for Water Management Strategies & Projects..... | 35 |
| 5.1 | WMS..... | 36 |
| 5.1.1 | WMS Source Use Types associated with existing sources..... | 37 |
| 5.1.2 | WMS Source Use Types associated with future sources | 43 |
| 5.2 | Allocating WMS Supply to Entities and Assigning WMS Water Losses | 44 |
| 5.3 | Over-Allocating WMS Sources | 45 |
| 5.3.1 | Existing Source Availability Over-Allocation | 46 |
| 5.3.2 | Availability Increase Over-Allocation | 46 |
| 5.3.3 | Entity Supply Over-Allocation | 46 |
| 5.3.4 | WUG Existing Supply Over-Allocation..... | 46 |
| 5.4 | WMS Supplies Interbasin Transfers | 46 |
| 5.5 | Grouping WMS..... | 46 |
| 5.6 | Conjunctive Use WMS..... | 47 |
| 5.7 | WMS Project | 47 |
| 5.7.1 | WMS Project Sponsors | 48 |
| 5.7.2 | WMS Project Components..... | 48 |
| 5.7.3 | Relating a WMSP to a WMS..... | 49 |
| 5.7.4 | WMS Project Recommendation Type..... | 49 |
| 5.7.5 | WMS Project Hierarchies..... | 49 |
| 5.8 | WUG Unmet Needs/Surpluses..... | 50 |
| 5.9 | Interregional WMS and WMS Projects | 50 |
| 6 | Data Checks | 50 |

| | |
|--|-----------|
| 7 DB22 Data Setup and Assistance..... | 50 |
| Appendix 1 Data Units of Measure | 53 |
| Appendix 2 Methodology Used to Determine Total Availability by Source Subtype | 55 |
| Appendix 3 SWP WMS Type List | 57 |
| Appendix 4 List of Project Components..... | 59 |
| Appendix 5 Existing Sales & WUG Supply Water Transaction Example..... | 61 |
| Appendix 6 Demand Reduction Transfer WMS Example | 63 |
| Appendix 7 Existing Surplus WMS Example..... | 65 |
| Appendix 8 WUG Supply Reduction WMS Example | 67 |
| Appendix 9 WWP Customer Supply Reduction WMS Example..... | 69 |
| Appendix 10 Existing Availability WMS Example | 71 |
| Appendix 11 Availability Decrease/Increase WMS Example | 73 |
| Appendix 12 Existing Source Availability Increase WMS Example | 75 |
| Appendix 13 New Source Availability Increase WMS Example | 77 |
| Appendix 14 WMS Seller Relationships..... | 79 |
| Appendix 15 WMS Project Relationship Example | 81 |

Background

The Texas Legislature directed the Texas Water Development Board (TWDB) to establish standards for reports and data presented in regional water plans (RWPs). Section 16.053(d) of the Texas Water Code (TWC) states: “The Board shall provide guidelines for the format in which information shall be presented in the Regional Water Plans.” The rules found in 31 Texas Administrative Code (TAC) § 357 were promulgated from the TWC § 16.053(d). The current version of the guidance developed from 31 TAC § 357 is known as the *Guidelines for Regional Water Planning Data Deliverables*, which is Exhibit D in the regional water planning grant contracts.

These guidelines are separate from and in addition to the *General Guidelines for Fifth Cycle of Regional Water Plan Development*, which is Exhibit C in the regional water planning grant contracts.

Purpose

This guidance document, along with 31 TAC § 357, provides data reporting and formatting specifications for regional water planning groups (RWPGs) to follow when submitting electronic data to the TWDB, including submitting data into the Regional Water Planning Application/State Water Planning Database (DB22). It serves as a companion document to *General Guidelines for Fifth Cycle of Regional Water Plan Development*. If there is a conflict in the guidance between the two documents, the most current *General Guidelines for Fifth Cycle of Regional Water Plan Development* will take precedence. Both Exhibit C and Exhibit D are subject to revisions due to any future Legislative actions. The most up-to-date versions will be posted on the following website:

http://www.twdb.texas.gov/waterplanning/rwp/planningdocu/2021/current_docs.asp

The data submitted into DB22 by the RWPGs is used to develop the State Water Plan (SWP) and the Interactive SWP web application. The SWP is a statewide summary of the data developed at the regional level and is designed to help the State of Texas ensure that there is adequate water supply in a time of drought. The SWP data is used for a wide variety of data analyses, such as calculating Water User Group (WUG) water supply needs and source water balances, as well as the standardized data visualizations provided in the Interactive SWP for use by all stakeholders. It provides Texas Lawmakers and other decision makers with the information required to support Texas’ water planning process. Entering regional water planning data into DB22 correctly and consistently across the regional water planning areas (RWPAs) will help provide Texas with the data it needs to secure its water supply for future generations.

1 General Data Requirements

Data should conform and comply with all 31 TAC § 357 rules that require RWPGs to evaluate the adequacy of water supplies in each region during drought of record conditions. The data should also be developed based on the guidance in subsequent sections of this document and the most current *General Guidelines for Fifth Cycle of Regional Water Plan Development*. Evaluations should consider surface water, groundwater, reuse, and conservation data from the SWP, existing water rights, contracts and option agreements, and any other relevant planning, water supply, and conservation studies available. In addition

- submitted information must be accurate and based on the best data and science practicable;
- potential interregional conflicts should be identified and resolved prior to data being certified as complete by the RWPG;

- RWPGs must enter information into all fields in DB22 unless otherwise stated in the guidance documents;
- data provided should follow specified units of measure (see Appendix 1);
- spelling, word order, and proper names must be used consistently and correctly when entering data into DB22;
- proper names used in the RWPGs should match those entered in DB22;
- RWPGs must use the same reporting conventions for data shared by more than one region;
- RWPGs must agree on underlying data (e.g. availability numbers) prior to data entry;
- only whole numbers should be entered into DB22;
- projection, source availability, and water supply data are reported in planning decadal increments starting with the year 2020 and extending through the year 2070 (31 TAC § 357.10(21)). Each decadal increment is based on data associated with the first year of the decade and is representative of all years in that decade.

If application users have any questions regarding DB22 data entry, they are encouraged to contact TWDB Water Supply Strategy & Analysis (WSSA) staff early in the process to obtain assistance. This will avoid the inadvertent creation of errors that could be difficult to correct. WSSA staff contact information can be found on the Help page of the DB22 application.

2 Formats for Electronic Data

All final versions of files acquired or developed for the 2021 RWPGs are considered joint-property of the TWDB and are required to be submitted to the TWDB. All electronic files submitted to the TWDB by RWPGs should be provided in one delivery using flash drive or DVD and be in a ready-to-use format.

This includes but is not limited to all technical reports (MS Word and PDF), MS Excel files, Water Availability Model (WAM)/Groundwater Availability Model (GAM) input/output/supporting data files, GIS, CAD, and image-formatted data. Files required for delivery to the TWDB shall be in an approved format as specified in this document. Alternative software or delivery methods will be allowed with pre-approval from the TWDB if these requirements present a significant burden on the RWPG or as technology changes.

2.1 Introduction

Formats of all computer files provided to the TWDB should be compatible with widely distributed versions of the following software:

- Microsoft Word (MS Office 2010 or newer versions)
- Microsoft Excel (MS Office 2010 or newer versions)
- Microsoft Access (MS Office 2010 or newer versions)
- ArcGIS (10.0 or newer versions)
- Internet Explorer (11 or newer versions)
- Adobe Acrobat (2015 or newer versions)

2.2 File Formatting

2.2.1 Accessibility

The digital copy of the final RWP must comply with the requirements and standards specified in 1 TAC § 213, Subchapter B (Electronic and Information Resources Accessibility Standards for State Agencies).

All figures must have alternative text descriptions, except for decorative elements, which should be tagged as artifacts or background elements. The file must be titled and language specified. In addition, the document must establish a logical reading order through the consistent use of styles and headings. Non-accessible elements such as text boxes should be avoided.

2.2.2 PDF and MS Word Specifications

All PDFs intended for online publication must be tagged for accessibility and reflow. All electronic Adobe PDF files shall use embedded fonts with electronically searchable text. Hyperlinks should be live and bookmarks used in a consistent manner to provide easy navigation. Reading order should be evaluated and tab order correctly set. PDFs must pass the Acrobat accessibility full check. It is recommended that PDF files be a size of 50 MB or less to minimize the amount of time it will take to download from the TWDB website. However, if a larger file size is necessary, please ensure that the PDF file is no greater than a file size of 100 MB.

2.2.3 Image formatting

All drawings and graphs included in reports should also be provided separately to the TWDB in Encapsulated PostScript (EPS) or Tagged Image Format (TIFF) format. Color model should be CMYK and resolution should be 300 dpi.

2.2.4 Correspondence Specifications

All relevant email correspondence of significance shall be saved as PDF files and adhere to the PDF specifications in Section 2.2.2.

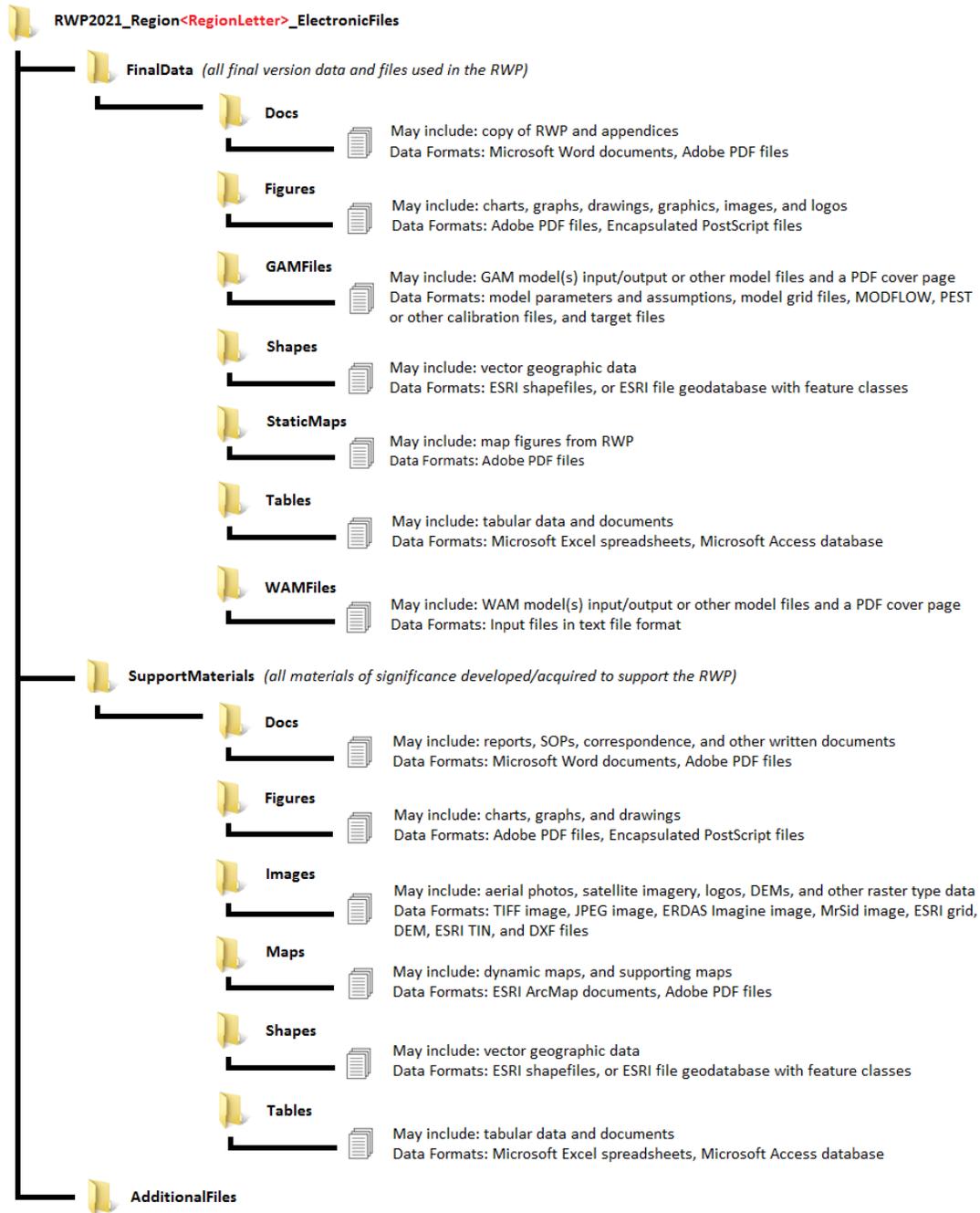
2.2.5 Model Input Files

All water availability model (WAM) and groundwater availability model (GAM) input files should be in their original text file format, so that they can be directly verified by a TWDB modeler. In the WAM input file, please include the six-character reservoir identification value.

2.3 File Structure

A standard naming convention should be used consistently for all file names and include the region letter, data type, and figure title when relevant. It is preferred that “camel case” be used for file name formatting, which is a formatting style that capitalizes the first letter of each word. File names should not contain spaces, or special characters except for underscores. See Figure 1 for an example of how data delivery folders should be structured. Contact the TWDB WSSA team if you would like to receive a folder containing the preferred folder structure. It is not necessary to include files that were provided by the TWDB as supporting materials if their use is clearly documented and referenced.

Figure 1. File Delivery Example



2.4 GIS Data Requirements

2.4.1 Metadata

All GIS files developed for the TWDB are required to have associated metadata. Deliverables are not considered complete without metadata. Metadata, including information about the data's projection, can be developed using one of several built-in or add-on tools within ArcGIS, and typically is associated with the geometry file as an XML file.

All GIS files submitted to the TWDB must have spatial reference information that describes the projection, datum, and where applicable, the collection methods.

2.4.2 Projection

All electronic geospatial data shall have spatial reference information and be projection defined (have its coordinate system identified and embedded in or associated with the data file).

Vector data shall be submitted in geographic coordinate system, decimal degree units, and NAD83.

Raster data, such as aerial photographs may be submitted in their native projection, and maps shall be in the appropriate projection/coordinate system for the area depicted.

All CAD data shall be in known real world coordinate space, ideally in geographic/decimal degrees/NAD83, and shall NOT be in page space or a custom site-specific projection.

2.4.3 Tabular Data

Should tabular data be appropriate to connect location information with attribute information, then documentation specifying the primary and foreign keys is required. Should coordinate information be provided in tabular format it should contain at minimum the following fields:

- ID: a unique identifier given to each feature
- Latitude: the Y-coordinate in decimal degrees
- Longitude: the X-coordinate in decimal degrees
- Datum: the horizontal datum of the coordinates

2.4.4 ArcMap Documents

All ArcMap documents (.mxd) or equivalent map document formats used in final map production are also required for delivery to the TWDB with accompanying data in a stand-alone directory structure. Map document formats also need to be configured to use relative paths and not be set to use a printer-specific paper setting.

2.4.5 Data Deliverables

Each RWPG is responsible for submitting a digital data file containing final geographic data for each recommended and alternative water management strategy project (WMSP) identified in the RWP. Section 5.7 further outlines data requirements for recommended and alternative WMSPs.

All GIS data representing entity centroids shall match the corresponding standard TWDB location as available from the TWDB. Please contact the TWDB WSSA team for each RWPA's entity coordinate list.

The WMSP vector data shall be divided into point, polygon, and polyline feature types across a maximum of three shapefiles in a single folder or three feature classes in a single file geodatabase. Files shall use a standard naming convention of "WMSPProject", Region letter, and geometry type (POINT, POLY, LINE) with no spaces and the geometry type in all caps. EX: WMSPProject_RegionA_POINT or WMSPProject_RegionL_POLY.

The file geodatabase format is recommended for large datasets that may exceed the shapefile size limit, or data may be broken into manageable sizes across multiple shapefiles. Multiple shapefiles may only be used due to size restrictions, and each shapefile will include an underscore and number at the end of the standard file name in numeric order for each additional shapefile. EX: WMSPProject_RegionB_LINE_1, WMSPPROJECT_RegionB_LINE_2. See Table 1 for a list of required shapefile/feature class attributes.

Table 1. Required shapefile/feature class attributes

| Field Name | Alias | Description | Format |
|------------|------------------------|---|------------------|
| ID | ID | Unique identifier for each feature | FID/OID |
| PROJECTID | WMS Project ID | DB22 WMS Project ID | Short integer, 5 |
| SPONSOR | Sponsor Region | Letter of RWPG project sponsor | String, 4 |
| NAME | WMS Project Name | DB22 WMS Project name | String, 100 |
| LAT | Latitude | Y-coordinate in decimal degrees | Double, 11, 7 |
| LONG | Longitude | X-coordinate in decimal degrees | Double, 11, 7 |
| LOCATION | Location | Description of location being represented | String, 255 |
| PROJCOMP | WMS Project Components | Components included at the project location | String, 255 |
| DATUM | Datum | Horizontal datum of the coordinates | String, 50 |

Additional attribute fields shall be included to provide further detail or clarification as needed.

RWPGs shall provide all supporting and final GIS data developed or acquired for the RWP, and geographic information illustrating important features of each RWPA including but not limited to

- political subdivisions,
- major water demand centers such as cities,
- major providers of municipal and manufacturing water,
- major water supply sources, and
- mapped aquifers.

It is not necessary to include geographic data that was provided by the TWDB as supporting materials if its use is clearly documented and referenced.

3 Data for Sources of Supply

This section describes the information found in the Sources module of DB22. All current and potential future sources of supply must be entered into the DB22 Sources module. Each source will be designated as ‘groundwater’, ‘surface water’, or ‘reuse’ and will also be categorized within a more specific *Source Subtype* category. Sections 3.3–3.5 provide instructions on how to apply source type labels to sources.

Source availability, referred to as *Total Availability* in DB22 is entered in the DB22 Sources module for all existing sources. It is defined in 31 TAC § 357.10(3) as being “the maximum amount of water that could be produced by a source during a repeat of the drought of record, regardless of whether the supply is physically connected to or legally accessible by water user groups”. Existing water supply is not the same as source availability. Existing supply is defined in TAC § 357.10(13), as the “maximum amount of water that is physically and legally accessible from existing sources for immediate use by a WUG under a repeat drought of record conditions” and is entered for WUGs in the DB22 Entities module. See Section 4 for Entity module information.

All new sources must be requested through the Sources module of DB22 and will be reviewed by the TWDB. It is important to ensure that the new source is legitimate and not a duplicate of another source

in the database prior to connecting it to entity water volumes and water management strategy (WMS) supplies. By taking the time to review the sources initially, less time will be required to verify the source data during review of the initially prepared plans. When a source is no longer applicable, a request must be submitted to the TWDB WSSA team in order to update the source to 'Inactive.'

Source data is used to analyze the types of sources that are used in each of the state's RWPAs. The source's existing *Total Availability* is also used to ensure that the amount of water allocated to WUGs as current supply does not exceed the source's available water volumes during a drought of record (i.e. source is not over-allocated).

3.1 Source Status

When requesting to add a new source through the DB22 application, the source will be identified as 'existing', 'future', or 'both' existing and future by selecting a value from the field labeled *Is this an existing or future source?*. Only sources that are labeled as 'existing' or 'both' have the potential to be related to entities as directly accessed source water volumes, sales/transfers, or WUG existing supplies in the DB22 Entities module. See Section 4 for Entity module information. Only sources with a source status of 'future' or 'both' can be related to a WMS in the DB22 WMS module. See Section 5 for WMS module information. Once a source is approved, a request must be sent to the TWDB WSSA team in order to update the source status to a different value.

3.1.1 Existing Sources

'Existing' sources are defined as currently available for entities to connect with and use. Source availability will be entered for all existing sources in the DB22 Sources module. See Sections 3.3–3.5 for additional information regarding source availability by source type.

3.1.2 Future Sources

'Future' only sources are not currently available for use. A WMSP must be developed in order for the future source to be available for use by WUGs. Once a future source is created through the DB22 Sources module, it can be related to one or more WMSs which are then related to a WMSP. Future sources require the following fields to be entered in the DB22 Sources module which are described in detail by *Source Subtype* in Sections 3.3–3.5:

- Source Name
- Source Detail
- Source Region
- Source County
- Source Basin
- Source Type
- Source Subtype
- Is this source generally considered brackish or saline?
- Source Comments

An example of a future source is a new reservoir or a new aquifer storage and recovery (ASR) project. Source availability will be entered for all future sources using the DB22 WMS module. Once a future source is related to a WMS having a *WMS Source Use Type* of 'Availability Increase', future supply made available through the WMS can be entered with the WMS source. See Section 5.1.2 for more information on relating 'future' sources to an availability increase WMS.

3.1.3 Both Existing & Future Sources

Sources can be used as both existing availability and as part of a WMS. When a source with a source status of 'both' is related to a WMS, it can mean that the existing availability is being delivered to WUGs as part of the WMS or an existing source's availability is being increased or decreased through the WMS. For example, a WMS can be added that reallocates a reservoir's conservation pool to increase the amount of supply that could be delivered to WUGs. See Section 5.1.1.7 for more information on relating sources with a status of 'both' to a WMS. Existing availability for sources with a status of 'both' will be entered in the DB22 Sources module the same as 'existing' sources and can be allocated to WUGs as either existing supplies or through a WMS having a *WMS Source Use Type* of 'Existing Availability'. Future availability will be entered once the source is related to a WMS having a *WMS Source Use Type* of 'Availability Increase' (as with 'future' sources). See Sections 3.3–3.5 for additional information regarding existing source availability by source type.

3.2 Water Quality

The salinity and impacts to source availability data values are collected for each *Source Subtype*. Salinity is collected for existing sources and future sources, but the impacts to source availability value is only collected for sources with a status of 'existing' or 'both'.

3.2.1 Salinity

The DB22 Sources module field, *Is this source generally considered brackish or saline?*, indicates whether the source availability is considered 'fresh' (less than 1,000 mg/L), 'brackish' (1,000 to 10,000 mg/L), 'saline' (10,001 mg/L to 34,999 mg/L), or 'seawater' (35,000 mg/L or greater). Sources can also be labeled as 'fresh/brackish' or 'brackish/saline', if a combination of the salinity types is appropriate. The default value for the salinity field is 'fresh'. Once a source request is approved, a request must be sent to the TWDB WSSA team to change the salinity value of the source.

3.2.2 Impacts to Source Availability

The DB22 Sources module field, *Was Total Availability reduced due to water quality considerations?*, indicates whether water quality constraints were considered when developing total water availability estimates and *Total Availability* was reduced accordingly. The default value for this field is 'N' (no). If total availability has been reduced due to water quality considerations, add comments into the total availability comments field explaining the water quality issues.

- 'Y' (yes) = *Total Availability* was reduced due to water quality considerations
- 'N' (no) = *Total Availability* was not reduced due to water quality considerations

3.3 Surface Water Source Type

The following *Source Subtypes* are categorized under the *Source Type* 'Surface Water' in the DB22 Sources module. Data related to these *Source Subtypes* will be grouped under the surface water heading in the 2022 SWP. Under each *Source Subtype* heading is a list of data entry fields found in the Edit Source Details page of the DB22 Sources module and information on how to provide the required data.

3.3.1 Run-of-River Source Subtype

Water right permits that allow users to divert water directly from a river or stream are entered as a 'Run-of-River' *Source Subtype*. This *Source Subtype* does not include reservoir, off-channel reservoir, ASR, or reuse related water volumes. When a run-of-river supply contributes to the water volumes associated with those other *Source Subtypes*, this supply must be entered as the source it is contributing

to, using appropriate labeling as described in Sections 3.3–3.5. The following data fields are collected for sources labeled as ‘Run-of-River’:

- **Source Name:** A run-of-river source’s name is the concatenation of the basin it is located in and the text ‘RUN-OF-RIVER’. For example, a run-of-river source associated with the Canadian River Basin will have the name ‘CANADIAN RUN-OF-RIVER’.
- **Source Details:** The *Source Details* field provides additional information about the water rights included with the surface water source. When the run-of-river source is associated with a single water right, the *Source Detail* value should begin with ‘SINGLE’, then a forward slash ‘/’ and a brief description of the water right name. When the run-of-river source contains multiple water rights, the *Source Detail* value should begin with ‘MULTIPLE’, then a forward slash ‘/’ and a brief description of the water right grouping.
- **Source Region, County, & Basin:** When selecting a planning region, county, and basin for this *Source Subtype*, they should represent the location of the run-of-river diversion.
- **Methodology used to determine availability volumes:** Select the methodology value that best represents how the source availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen. The most common methodology values for a run-of-river source are ‘WAM Run 3’ or ‘WAM Run 3 Modified’. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. Certain Methodology values require additional comments, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the existing firm diversion water volume in acre-feet for each planning decade as specified in Exhibit C Section 3.2. Future availability developed through a WMS should be entered as an Availability Increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an Availability Increase WMS and its WMS supply.
- **Source Comments:** Comment fields are provided for both the source level and the source availability level. For sources with a subtype of ‘run-of-river’, use the source availability comments field to provide a more detailed description of the water rights included with the source which can include the ownership, water right number, permit diversion, and type of usage.

3.3.2 Reservoir Source Subtype

Sources that have a *Source Subtype* of ‘Reservoir’ represent a single reservoir that is not included in a reservoir system. When water is stored in a reservoir, it is labeled as a surface water reservoir in the database even if the origin of the stored water is a different *Source Subtype*. For example, when water is pumped from a run-of-river during a period of high streamflow and used as the source water of an off-channel reservoir, the reservoir must be entered in the database along with information regarding the origin of the reservoir’s water supply in the source comments field, rather than linking the entities using the reservoir’s supply to the run-of-river source. If reuse water contributes to an existing or future reservoir, it must be added as a separate reuse source. See Section 3.5 for information on how to create a reuse source. During Texas legislative sessions, the TWDB is asked for a list of existing and proposed reservoirs and their attributes. When a WMS is associated with a reservoir project, but the source of the water is not a reservoir, the data is difficult to query and analyze, which is why it is important to standardize these *Source Subtypes*. The following fields are collected for sources labeled as ‘Reservoir’:

- **Source Name:** A reservoir’s source name is the concatenation of the name of the reservoir and the text ‘LAKE/RESERVOIR’. For example, Lake Meredith will have the name ‘MEREDITH LAKE/RESERVOIR’.

- Source Detail: The source details field is available to provide additional information regarding the reservoir and the origin source of its water supply.
- Source Region, County, & Basin: Since reservoir sources can exist in multiple counties, the county field value, 'reservoir' was created and should be selected for all reservoirs. The region should reflect the planning region that the reservoir is primarily located in and the basin should reflect the basin that it is located in. For example, the geographic area of the Palo Duro Reservoir is labeled as Region 'A', 'Reservoir' County, and 'Canadian' Basin.
- Methodology: Select the *Methodology* value that best represents how the source availability was determined when the source has a source status of 'existing' or 'both'. See Section 3.1 for more information on how the Source Status is chosen. The most common methodology values for a reservoir source are 'Water Availability Model (WAM) Run 3' or 'WAM Run 3 Modified'. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. Certain Methodology values require additional comments, please enter them into the methodology value comments box.
- Total Availability: The *Total Availability* column represents the existing reservoir availability in acre-feet for each planning decade as specified in Exhibit C Section 3.2. The *Total Availability* will represent firm availability unless a hydrologic variance request is granted. If a hydrologic variance is granted, the total availability will represent the modeled availability based on the approved hydrologic variance request. When a reservoir is labeled as an off-channel reservoir and its *Total Availability* water volumes are being deducted from a run-of-river's firm availability, then the related run-of-river *Total Availability* must be reduced to show the movement of water volume from the run-of-river source to the off-channel reservoir in the DB22 application. If the off-channel storage does not rely on the firm portion of the run-of-river water right, then the run-of-river firm availability does not need to be reduced to account for the off-channel reservoir's availability. When entering off-channel reservoir future availability as part of a WMS, see Section 5.1.2 for information on how to enter its future availability and WMS supplies. See Section 5.1.1.7 for information on how to enter a future availability associated with an existing reservoir.
- Firm Availability: If a hydrologic variance request is approved and the *Total Availability* does not represent the firm availability as specified in Exhibit C Section 3.2, firm availability must also be entered for the reservoir. To enter existing firm availability related to the reservoir, select the 'N' value on the field, *Is total availability based on firm yield?* and click the **Update** button on the Edit Source Details page of the DB22 Sources module for the specified reservoir. A Firm Yield decadal water volume column will then display for each planning decade and must be filled out. Please specify in the methodology comments field additional information regarding the hydrologic variance request including the TWDB Executive Administrator approval date and a brief description such as 'addition of return flows' or 'reservoir safe yield'. For a complete list of examples from past plans of potentially appropriate surface water modeling assumptions for RWP development, see Exhibit C Section 3.6.2.
- Conservation Pool: Source *Conservation Pool* capacity values are based upon the reservoir's most recent hydrographic survey and are entered in acre-feet. This is an update to the guidance used in previous planning cycles when the original permitted amount was entered into this field. Because of this update to the guidance, the data will need to be reentered.
- Is this reservoir or reservoir component of this system associated with a federal facility, or water right owned or controlled by a federal agency (e.g. dam owned or reservoir operated by a federal agency)?: The default value for this field is 'N'. If the reservoir is associated with a federal agency, then the field should be updated to 'Y'.

- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include any additional information about the reservoir and its source availability. At a minimum, please include all counties that the reservoir is located in.
- **Reservoir Major/Minor Designation:** In the DB22 database, all reservoirs will be labeled as ‘major’ or ‘minor’. A major reservoir is defined as an impoundment with a storage capacity of at least 5,000 acre-feet at its normal operating level when it was originally permitted. A minor reservoir is defined as having less than 5,000 acre-feet of storage capacity at its normal operating level when it was originally permitted. Reservoirs will be labeled as ‘major’ or ‘minor’ by the TWDB WSSA team in a database table that contains a list of DB22 reservoirs. When a new reservoir is requested, please provide this information in the source request comment box, and the TWDB WSSA team will make sure that the reservoir is correctly labeled.
- **Off-Channel Reservoir Designation:** When a reservoir is located off of the main stem of the river and contains water from a river or stream that is diverted for off-channel storage, this field will be labeled ‘Y’ by the TWDB WSSA team in a database table that contains a list of DB22 reservoirs. When a new reservoir is requested, please include a note stating that the requested reservoir is considered off-channel in the source request comment box, and the TWDB WSSA team will make sure that the reservoir is correctly labeled.

3.3.3 Reservoir System Source Subtype

When multiple reservoirs are operated together as a reservoir system and they meet the criteria listed in Exhibit C Section 3.3, they will have the *Source Subtype* ‘RESERVOIR SYSTEM’. All reservoir systems must be approved by TWDB staff. If reuse water contributes to a system’s existing or future reservoir, it must be added as a separate reuse source. See Section 3.5 for information on how to create a reuse source. The following fields are collected for sources labeled as ‘Reservoir System’:

- **Source Name:** A reservoir system’s source name is the concatenation of the name of the system and the text ‘LAKE/RESERVOIR SYSTEM’. For example, the Highland lakes system will have the name ‘HIGHLAND LAKES LAKE/RESERVOIR SYSTEM’.
- **Source Detail:** The source detail field is available to provide additional information regarding the reservoir system.
- **Source Region, County, & Basin:** Since system sources can cross multiple counties, the county field value, ‘reservoir’ was created and should be selected for each reservoir system source. The region should reflect the planning region that the reservoir system is primarily located in and the basin should reflect the basin that it is located in. For example, the geographic area of the Highland Lakes Reservoir System is labeled as Region ‘K’, ‘Reservoir’ County, and ‘Colorado’ Basin.
- **Methodology:** Select the methodology value that best represents how the source availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen. The most common methodology values for a reservoir system source are ‘Water Availability Model (WAM) Run 3 or WAM Run 3 Modified. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. Certain Methodology values require additional comments, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the existing reservoir system availability including any system gains in acre-feet for each planning decade as specified in Exhibit C Section 3.2. The *Total Availability* will represent firm availability unless a hydrologic variance request is granted. If a hydrologic variance is granted, the total availability will represent the modeled availability based on the approved hydrologic variance request. When

entering reservoir system future availability as part of a WMS such as a system operations update, see Section 5.1.1.7 and Section 5.1.2 for information on how to enter its future availability and WMS supplies.

- **Firm Availability:** If a hydrologic variance request is approved and the *Total Availability* does not represent the firm availability as specified in Exhibit C Section 3.2, firm availability must still be entered for the reservoir system. To enter existing firm availability related to the reservoir system, select the ‘N’ value on the field, *Is total availability based on firm yield?*, and then click the **Update** button on the Edit Source Details page of the DB22 Sources module. A Firm Yield decadal water volume column will then display for each planning decade and must be filled out. Please specify in the methodology comments field additional information regarding the hydrologic variance request including the TWDB Executive Administrator approval date and a brief description such as ‘reservoir system operations’. For a complete list of examples from past plans of potentially appropriate surface water modeling assumptions for RWP development, see Exhibit C Section 3.6.2.
- **Conservation Pool:** The *Conservation Pool* capacity value for each of the reservoirs that makes up the reservoir system must be entered. Source *Conservation Pool* capacity values are based upon the reservoir’s most recent hydrographic survey and are entered in acre-feet. This is an update to the guidance used in previous planning cycles when the original permitted amount or earliest hydrographic survey was entered into this field. Because of this update to the guidance, the data will need to be reentered.
- **Is this reservoir or reservoir component of this system associated with a federal facility, or water right owned or controlled by a federal agency (e.g. dam owned or reservoir operated by a federal agency)?:** The default value for this field is ‘N’. If the reservoir is associated with a federal agency, then the field should be updated to ‘Y’.
- **Source System Firm Availability:** The source system availability fields represent the firm availability of each of the reservoirs that make up the system in acre-feet for each planning decade. It is no longer required that RWPGs determine the firm yield of the individual reservoirs that are combined into a system source. If firm yield data will not be entered for the system’s reservoirs or if the firm yield of a specific system reservoir is not known, please leave its associated decadal fields blank.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include any additional information about the reservoir system and its source availability. At a minimum, please include all counties that the system reservoirs are located in.
- **Reservoir Major/Minor Designation:** All reservoirs associated with the system will be labeled as ‘major’ or ‘minor’. A major reservoir is defined as an impoundment with a storage capacity of at least 5,000 acre-feet at its normal operating level when it was originally permitted. A minor reservoir is defined as having less than 5,000 acre-feet of storage capacity at its normal operating level. Reservoirs will be labeled as ‘major’ or ‘minor’ by the TWDB WSSA team. When a new reservoir is requested, please provide this information in the source request comment box and the TWDB WSSA team will make sure that the reservoir is correctly labeled.
- **Off-Channel Reservoir Designation:** When a reservoir reported as part of a system is located off of the main stem of the river and contains water from a river or stream that is diverted for off-channel storage, this field will be labeled ‘Y’ by the TWDB WSSA team in a database table that contains a list of DB22 reservoirs. When a new reservoir is requested, please include a note stating that the requested reservoir is considered off-channel in the source request comment box, and the TWDB WSSA team will make sure that the reservoir is correctly labeled.

3.3.4 Livestock Local Supply Source Subtype

Livestock local supply sources represent limited, unnamed individual surface water supplies that are available only for use by livestock WUGs. The following fields are collected for sources with a *Source Subtype* label of ‘Livestock Local Supply’:

- **Source Name:** A livestock local supply source name is the concatenation of the river basin the source is located in and the text ‘LIVESTOCK LOCAL SUPPLY’. For example, a livestock local supply source found in the Brazos River Basin will have the name ‘BRAZOS LIVESTOCK LOCAL SUPPLY’.
- **Source Detail:** The source detail field is available to provide additional information regarding the livestock local supply source.
- **Source Region, County, & Basin:** When selecting a planning region, county, and basin for this *Source Subtype*, they should represent the location of the livestock local supply source.
- **Methodology:** Select the methodology value that best represents how the source availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen. The most commonly used methodology value for a ‘livestock local supply’ source is ‘Published Reports/Data’. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the existing firm livestock local supply volume in acre-feet for each planning decade. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include any additional information about the livestock local supply source and its related water volumes.

3.3.5 Other Local Supply Source Subtype

Other local sources represent limited, unnamed individual surface water supplies that are available only for **non-Municipal** WUGs other than livestock. The following fields are collected for sources with a *Source Subtype* label of ‘Other Local Supply’:

- **Source Name:** An ‘other local supply’ source name is the concatenation of the river basin the source is located in and the text ‘OTHER LOCAL SUPPLY’. For example, an ‘other local supply’ source found in the Red River Basin will have the name ‘RED OTHER LOCAL SUPPLY’.
- **Source Detail:** The source detail field is available to provide additional information regarding the other local supply source.
- **Source Region, County, & Basin:** When selecting a planning region, county, and basin for this *Source Subtype*, they should represent the location of the other local supply source.
- **Methodology:** Select the methodology value that best represents how the source availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen. The most commonly used methodology value for an ‘other local supply’ source is ‘Published Reports/Data’. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the existing firm other local supply volume in acre-feet for each planning decade. Future availability developed through a WMS

should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.

- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include any additional information about the other local supply source and its related water volumes.

3.3.6 Rainwater Harvesting Source Subtype

Rainwater harvesting sources represent the collective benefits of rainwater catchment systems currently used or being planned for within the region, county, and basin area the source is located in. Rainwater harvesting is the capture and storage of rainwater for uses such as landscape irrigation, livestock, potable and non-potable indoor use, manufacturing, and storm water abatement. Rainwater harvesting water supply collected and used to add additional water to aquifers should be entered as a groundwater source. See Section 3.4.1.4 for more information. Rainwater collected in ponds and lakes that do not meet the minor or major reservoir criteria should be entered as livestock local supply or other local supply. See Section 3.3.4 and Section 3.3.5 for more information. Source availability associated with the ‘rainwater harvesting’ *Source Subtype* represents water that is collected through a system in a containment basin or tank. The following fields are collected for sources with a *Source Subtype* label of ‘Rainwater Harvesting’:

- **Source Name:** ‘rainwater harvesting’ source name is the concatenation of the river basin the source is located in and the text ‘RAINWATER HARVESTING’. For example, a ‘rainwater harvesting’ source found in the Sulphur River Basin will have the name ‘SULPHUR RAINWATER HARVESTING’.
- **Source Detail:** The source detail field should represent the intended method of use. For example, ‘Landscape Irrigation’, ‘Potable Use’, or ‘Storm Water Abatement.’
- **Source Region, County, & Basin:** When selecting a planning region, county, and basin for this *Source Subtype*, they should represent the location of the rainwater harvesting system(s) source.
- **Methodology:** Select the methodology value ‘Other’ and in the comments field add information about how the total availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen.
- **Total Availability:** The *Total Availability* column represents the existing rainwater harvesting supply volume in acre-feet for each planning decade. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level for existing sources and just the source level for future sources. These fields should include any additional information about the rainwater harvesting catchment systems and its related water volumes.

3.3.7 Gulf of Mexico Source Subtype

‘Gulf of Mexico’ sources represent seawater desalination plants, which process seawater typically containing total dissolved solids of 35,000 milligrams per liter or greater. Each ‘Gulf of Mexico’ source should represent a single desalination plant. The following fields are collected for sources with a *Source Subtype* label of ‘Gulf of Mexico’:

- **Source Name:** ‘Gulf of Mexico’ will be the source name for each ‘Gulf of Mexico’ source.
- **Source Detail:** The name of the desalination plant that produces the water supply will be included in the source detail field. If a region has more than one seawater desalination plant, a

Gulf of Mexico source should be created for each plant having the same Source Name, Source Region, Source County, and Source Basin. The Source Detail value distinguishes each desalination plant and the water volumes that it makes available.

- **Source Region, County, & Basin:** A 'Gulf of Mexico' source has been added to the DB22 database for each region that borders the Gulf of Mexico (Regions: H, K, L, M, and N). The county name and basin name for 'Gulf of Mexico' sources will also be 'Gulf of Mexico'.
- **Methodology:** Select the methodology value that best represents how the source availability was determined when the source has a source status of 'existing' or 'both'. See Section 3.1 for more information on how the Source Status is chosen. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the existing Gulf of Mexico supply made available from the desalination plant in acre-feet for each planning decade. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include any additional information about the Gulf of Mexico source and its related water volumes.

3.3.8 Atmosphere Source Subtype

The 'Atmosphere' *Source Subtype* represents only supply made available through weather modification. Atmosphere sources are created so that they can be related to WMS in order to reflect the potential water produced through weather modification. Weather modification sources are considered a future source whose supplies can only be made available through a WMS. See Section 5.1.2 for more information on how to enter a future source WMS. The following fields are collected for sources with a *Source Subtype* label of 'Atmosphere':

- **Source Name:** The source name for atmosphere source is 'WEATHER MODIFICATION'.
- **Source Region, County, & Basin:** When the source is 'Weather Modification', the region will represent the region sponsoring the weather modification WMS. County and Basin will have a value of 'ATMOSPHERE' since a precise county and basin is difficult to determine. For example, the geographic area of a Region A 'Atmosphere' source is labeled as Region 'A', 'Atmosphere' County, and 'Atmosphere' Basin.
- **Source Detail:** The source detail field is available to provide additional information regarding the atmosphere source.
- **Methodology:** Methodology is not collected for future only sources. Information regarding the WMS associated with the weather modification source will be provided in the WMS module.
- **Total Availability:** Since weather modification is a future source, the *Total Availability* will not be collected in the DB22 Sources Module. Instead, the potential increase in water volume will be entered with the WMS that the source is related to. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- **Source Comments:** Comment fields are provided at the source level. These fields should include any additional information about the atmosphere source and its source availability.

3.4 Groundwater Source Type

The following *Source Subtypes* are categorized under the *Source Type*, ‘groundwater’ in the DB22 Sources module. Data related to these source subtypes will also be grouped under the groundwater heading in the 2022 SWP. Under each *Source Subtype* heading is a list of data entry fields found in the Edit Source Details page of the DB22 Sources module and information on how to provide the required data.

3.4.1 Groundwater Source Subtype

The *Source Subtype* ‘groundwater’ supply category includes groundwater that is naturally occurring and does not include water that is being stored as part of an ASR project. Sources with a subtype of ‘groundwater’ may have limited source availability depending upon their adopted desired future condition (DFC) and associated Modeled Available Groundwater (MAG) volume. ‘Groundwater’ *Source Subtypes* are further divided into three categories based on the methodology used to determine their total available water volumes: ‘MAG’, ‘RWPG-Estimated Groundwater Availability (Non-MAG Availability)’, and ‘Partial MAG’. The following fields are collected for sources with a *Source Subtype* of ‘Groundwater’:

- **Source Name:** A *Source Subtype* ‘groundwater’ source name is the concatenation of the aquifer name and the text ‘AQUIFER’. For example, a groundwater source associated with the Dockum Aquifer will have the name ‘DOCKUM AQUIFER’. If the source is considered an ‘Other Aquifer’ source, which represents any aquifer not designated as major or minor, the source name will be entered as just ‘OTHER AQUIFER.’
- **Source Detail:** The detail field may be left empty, but it can also contain information such as formation description or other text that helps describe the aquifer.
- **Source Region, County, & Basin:** The region, county, and basin values will represent the geographic location of the groundwater.
- **Other Aquifer:** If the source is considered an ‘Other Aquifer’ source, which represents an aquifer not designated as major or minor, this field will contain text describing the groundwater formation.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include any additional information about the groundwater source and its source availability.

3.4.1.1 Modeled Available Groundwater (MAG) Availability

Sources designated as a ‘MAG’ have total available water volumes that are based on the DFCs of the aquifer. For more information regarding DFCs, see Exhibit C Section 3.5. Groundwater sources with MAGs and the available water volumes are entered into the DB22 database by the TWDB WSSA team. Specific information should be provided, as necessary, for the following fields when the ‘groundwater’ subtype source is considered a MAG:

- **Methodology:** When a groundwater source is considered a ‘MAG’, then the methodology value ‘MODELED AVAILABLE GROUNDWATER (MAG)’ will be prepopulated. If a groundwater hydrologic variance, such as a requested MAG Peak Factor, has been approved for the MAG, please provide information regarding the request including the TWDB Executive Administrator approval date in the methodology comments field.
- **Total Availability:** The *Total Availability* column represents the MAG volume associated with the source multiplied by the source’s MAG Peak Factor (if applicable) for each planning decade in acre-feet/year.

- **MAG Availability:** The MAG availability field represents the MAG volume associated with the source in acre-feet/year for each planning decade. This data can only be edited by the TWDB WSSA team. See Exhibit C Section 3.5.1 for information regarding MAG availability.
- **MAG Peak Factor:** The MAG Peak Factor field represents the approved MAG Peak Factor value (if applicable) by planning decade. This data can only be edited by the TWDB WSSA team. When a MAG Peak Factor is not applied to a planning decade, a value of '1.0000' will be entered. See Exhibit C Section 3.6.1 for information regarding the MAG Peak Factor.

3.4.1.2 RWPG-Estimated Groundwater Availability (Non-MAG Availability)

Sources designated as 'RWPG-Estimated Non-MAG' represent aquifers or portions of an aquifer where no DFC has been adopted. It is the discretion of the region to determine the groundwater availability associated with these sources. Specific information should be provided, as necessary, for the following fields when the 'groundwater' subtype source is considered RWPG-Estimated Non-MAG:

- **Methodology:** When a groundwater source is considered a 'RWPG-Estimated Non-MAG', commonly used methodology values are 'Published Reports/Data', and 'Permitted Amount'. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* field represents the existing RWPG-Estimated Non-MAG availability in acre-feet/year for each planning decade as specified in Exhibit C Section 3.5.2.

3.4.1.3 Partial MAG Availability

Sources designated as 'Partial MAG' represent sources where a portion of its region, county, and basin geographic area has an adopted DFC, but the remainder of the source area does not. These sources will have both MAG volumes that represent the portion of the source with the adopted DFC and may also have related RWPG-Estimated Non-MAG water volumes which can represent part of an aquifer or an aquifer layer designated non-relevant. The MAG volumes will be entered by the TWDB WSSA team, and the RWPG is responsible for entering the RWPG-Estimated Non-MAG portion of the total available water volume associated with the source. Specific information should be provided, as necessary, for the following fields when the 'groundwater' subtype source is considered Partial MAG:

- **Methodology:** When a groundwater source is considered a 'partial MAG', the methodology value 'other' is the most commonly used. This value allows the RWPG consultant to provide more information regarding the methodology used in the Methodology Comments field.
- **Total Availability:** The *Total Availability* column represents the sum of the MAG volume associated with the source multiplied by the source's approved MAG Peak Factor value (if applicable) and the RWPG-Estimated Non-MAG availability for each planning decade in acre-feet/year.
- **MAG Availability:** The MAG availability field represents the MAG value associated with the source in acre-feet/year for each planning decade. This data can only be edited by the TWDB WSSA team. See Exhibit C Section 3.5.1 for information regarding MAG availability.
- **MAG Peak Factor:** The MAG Peak Factor field represents the approved MAG Peak Factor value (if applicable) by planning decade. This data can only be edited by the TWDB WSSA team. When a MAG Peak Factor is not applied to a planning decade, a value of '1.0000' will be entered. See Exhibit C Section 3.6.1 for information regarding the MAG Peak Factor.
- **Non-MAG Availability:** The Non-MAG availability field represents the existing RWPG-Estimated Non-MAG availability in acre-feet/year for each planning decade as specified in Exhibit C Section 3.5.2.

3.4.1.4 Artificial Recharge Availability

Artificial recharge (AR) typically takes place when water is added to infiltration pits or basins or spread across a permeable surface to recharge an aquifer. If a source with a *Source Subtype* of 'groundwater' is currently benefitting from AR, its total available water volumes should reflect the benefits of the AR project. The source availability comments section should include notes that AR is taking place and information about the origin source of the water also needs to be included. When reuse water is being used to artificially recharge an aquifer, a reuse source must be used to account for the water. See Section 3.5.2 for more information on how to add and update an indirect reuse source. If AR is occurring as part of a WMS that will increase the *Total Availability* of an existing groundwater source once the WMS is implemented, then see Section 5.1.1.7 for more information on how to set up an availability increase WMS that uses AR.

3.4.2 Aquifer Storage & Recovery Source Subtype

The *Source Subtype* 'Aquifer Storage and Recovery' (ASR) represents "a project involving the injection of water into a geologic formation for the purpose of subsequent recovery and beneficial use by the project operator" according to the TWC § 27.151 (1). ASR sources should be treated as a separate source from aquifer supplies in the same geographic area that it is located in because the water being added is accounted for separately from the existing natural availability of the aquifer. The following fields are collected for sources labeled as 'Aquifer Storage & Recovery':

- **Source Name:** A *Source Subtype* 'aquifer storage & recovery' source name is the concatenation of the aquifer name and the text 'AQUIFER ASR'. For example, an ASR source associated with the Sparta Aquifer will have the name 'SPARTA AQUIFER ASR'.
- **Source Detail:** The source detail field should list one or more sources that represent the origin of the ASR water supply. If the origin source is a reservoir, then include the name of the reservoir as listed in DB22. If the origin source is a run-of-river, then include the concatenation of the basin it is located in and the text 'RUN-OF-RIVER'. If the origin source is another groundwater source, then include the concatenation of the aquifer name and the text 'AQUIFER'. If the source is reuse, then include the concatenation of the producer's name and the text 'REUSE.' Multiple sources should be separated by a semi-colon.
- **Source Region, County, & Basin:** The region, county, and basin values will represent the geographic location of the groundwater ASR project.
- **Methodology:** Select the methodology value that best represents how the source availability was determined when the source has a source status of 'existing' or 'both'. See Section 3.1 for more information on how the Source Status is chosen. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the existing firm ASR supply volume in acre-feet/year for each planning decade. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include additional information about the ASR groundwater source and the origin of its water. Information regarding water rights and permits required for the ASR source availability should be included in the source availability comments field.

3.5 Reuse Source Type

The following *Source Subtypes* are categorized as ‘reuse’ in the DB22 Sources module. Data related to these *Source Subtypes* will also be grouped under the reuse heading in the 2022 SWP. Under each *Source Subtype* heading is a list of data entry fields found in the Edit Source Details page of the DB22 Sources module and information on how to provide the required data. DB22 Sources module reuse sources do not include ASR related water volumes. When reuse contributes to an ASR source, it is labeled as ASR water and the *Source Details* field contains notes about the reuse source. See Exhibit C Section 3.4 for additional information regarding reuse sources.

3.5.1 Direct Reuse (Potable/Non-Potable)

Direct reuse is the beneficial of reclaimed water that is piped directly from the wastewater treatment plant to the place where it is used. Direct reuse has two related *Source Subtypes*: ‘Direct Potable Reuse’ and ‘Direct Non-Potable Reuse’. When choosing which *Source Subtype* to use, assign the potable status of the water based on its intended use. For example, if the direct reuse source will be used for just irrigation, then it will most likely require the direct non-potable reuse *Source Subtype*. Or, if the direct reuse source is intended for municipal use such as drinking water or potable use, then it will require the direct potable reuse *Source Subtype*. The TWDB WSSA team will apply the *Source Subtype* of ‘direct non-potable reuse’ to all existing direct reuse sources as default when setting up the DB22 data and will work with RWPG consultants to ensure that direct reuse sources are properly entered and categorized. The following fields are collected for sources labeled as ‘Direct Potable Reuse’ and ‘Direct Non-Potable Reuse’:

- **Source Name:** All direct reuse sources will be named ‘DIRECT REUSE’.
- **Source Region, County, & Basin:** The region, county, and basin values will represent the geographic location of the associated wastewater treatment plant.
- **Source Detail:** The source detail field will include the reuse producer’s name and a forward slash ‘/’ followed by the name of the recipient of the reuse water. For example, if the City of Gainesville is producing direct reuse that will be provided to an irrigation WUG in Cook County, the Source Detail would be entered as ‘Gainesville/Irrigation, Cook’.
- **Methodology:** Select the methodology value that best represents how the source availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- **Total Availability:** The *Total Availability* column represents the direct reuse availability in acre-feet/year for each planning decade as specified in Exhibit C Section 3.4. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- **Source Comments:** Comment fields are provided at both the source level and the source availability level. These fields should include additional information about the direct reuse source and the origin of its water. Information regarding water rights and permits required for the direct reuse source availability should be included in the source availability field.

3.5.2 Indirect Reuse (Potable/Non-Potable)

Indirect reuse is the beneficial use of reclaimed water that is discharged to a water supply source such as a river, stream, or aquifer and then diverted and used again. Indirect reuse has two related *Source*

Subtypes: ‘Indirect Potable Reuse’ and ‘Indirect Non-Potable Reuse’. When choosing which *Source Subtype* to use, assign the potable status of the water based on its intended use. For example, if the indirect reuse source will be used for just irrigation, then it will most likely require the indirect non-potable reuse *Source Subtype*. Or, if the indirect reuse source is intended for municipal use such as augmenting a water supply source, then it will require the indirect potable reuse *Source Subtype*. The TWDB WSSA team will apply the *Source Subtype* of ‘indirect potable reuse’ to all existing indirect reuse sources when setting up the DB22 data and will work with RWPG consultants to ensure that indirect reuse sources are properly entered and categorized. The following fields are collected for sources labeled as ‘Indirect Potable Reuse’ and ‘Indirect Non-Potable Reuse’:

- Source Name: All indirect reuse sources will be named ‘INDIRECT REUSE’.
- Source Region, County, & Basin: The region, county, and basin values will represent the geographic location of indirect reuse diversion.
- Source Detail: The source detail field will include the reuse producer’s name and a forward slash ‘/’ followed by the receiving body of water. For example, if the City of Dallas is producing indirect reuse that is added to Lake Lewisville, the Source Detail would be entered as ‘DWU/Lake Lewisville’.
- Methodology: Select the methodology value that best represents how the source availability was determined when the source has a source status of ‘existing’ or ‘both’. See Section 3.1 for more information on how the Source Status is chosen. For a complete list of acceptable values by *Source Subtype*, see Appendix 2. If additional comments are required for the chosen methodology type, please enter them into the methodology value comments box.
- Total Availability: The *Total Availability* column represents the indirect reuse availability in acre-feet/year for each planning decade as specified in Exhibit C Section 3.4. Future availability developed through a WMS should be entered as an availability increase WMS. See Section 5.1.1.7 and Section 5.1.2 for information on how to enter an availability increase WMS and its WMS supplies.
- Source Comments: Comment fields are provided at both the source level and the source availability level. These fields should include additional information about the indirect reuse source and the origin of its water. Information regarding water rights and permits required for the indirect reuse source availability should be included in the source availability field. If the reuse source is being used for artificial aquifer recharge (Section 3.4.1.4), please note the name of the aquifer it will be recharging in the source comments field.

3.6 Conjunctively Used Sources

Surface water, groundwater, and/or reuse sources may be used conjunctively to optimize the beneficial characteristics of each source. However, each source’s existing and future availability must be entered separately and each source must be related with entities using the conjunctively used sources. By entering the data this way, data can still be aggregated and reported by the *Source Type* and subtype. In the Sources module, notes must be entered at the source level to explain how the source is being conjunctively used with other sources. For example, an entity that is considered both a WUG and a wholesale water provider (WWP) gets 20 percent of its water from surface water and 80 percent of its water from groundwater. It blends and treats the water from the two *Source Types*, then sells it to its retail and wholesale customers. In this situation, since the different sources are blended and then sold, the percentage of each source received is applied to the total sold water volume in order to divide out all sources of supply to the entity’s customers and demonstrates that they are dependent upon all sources being available to receive their supply. When sources are conjunctively used as existing WUG

supplies, please add a comment in the Entity WUG Supply comments box found on the Entity WUG Supply page of the DB22 Entities module that notes the sources of supply are conjunctively used together. In the WMS module, sources can be grouped as a single WMS or multiple WMSs to demonstrate how they are to be used conjunctively when the WMS is implemented. See Section 5.6 for more information on how to enter conjunctive use WMSs.

3.7 Interregional Sources

If more than one RWPG uses an individual surface water, groundwater, or reuse source, the availability volumes must be consistent among the regions sharing the source. The naming conventions for shared sources must also be listed consistently in the database application. These regions should proactively work together before data entry begins to ensure consistency of their shared data. Each database source record is related to a single planning region which is determined by the location of the source. It is the responsibility of that region to update and/or review the source details and availability water volumes related to the source. A source, such as a reservoir or an ASR, should not be entered multiple times to account for more than one region's use of the source. The agreed upon *Total Availability* should be entered for the source as a whole and the regions using it will connect entities to the source in the Entity module (Section 4) or the WMS module (Section 5). For example, the Toledo Bend Reservoir is located in Region I. It is Region I's responsibility to review and update the DB22 Sources module data related to the Toledo Bend Reservoir. Currently, only Region I entities use the Toledo Bend Reservoir as existing supplies, so it is also Region I's responsibility to enter the transaction water supply data in the DB22 Entities module. Regions C, D, H, and I all have recommended WMS that use remaining Toledo Bend Reservoir water supply. These regions must work together to enter their WMSs in accordance with their RWPs without over-allocating the source's *Total Availability* water volume.

3.8 Over-allocating Sources

RWPGs should not over-allocate water sources on a temporary or a permanent basis. Water volumes allocated to entities in the Entity module and WMS supplies that come from existing availability or entity surpluses are deducted from the source's existing *Total Availability* to ensure that sources are not over-allocated under drought-of-record conditions.

4 Data for Entities

This section describes the information found in the Entities module of DB22. The Entities module is used to display WUG projection data and collect data on currently permitted water supply, its sale, and its use as an existing WUG supply. Entity data is used to analyze and summarize the state's WUG population, water demand, and existing supply trends over the next five decades. Contract demand and entity sales information are collected for WWP to demonstrate WWP/customer relationships and the transfer of water to WUGs. WUG existing supply data is crucial to the planning process. It is used to calculate WUG water supply needs and to ensure that the state's sources of supply are not over-allocated during drought of record conditions.

4.1 Entity Types

Each entity listed in the database is labeled with an *Entity Type* which is used for data analysis and summarization. *Entity Types* include: 'WUG', 'WWP', 'WUG/WWP', or 'WUG/Seller'.

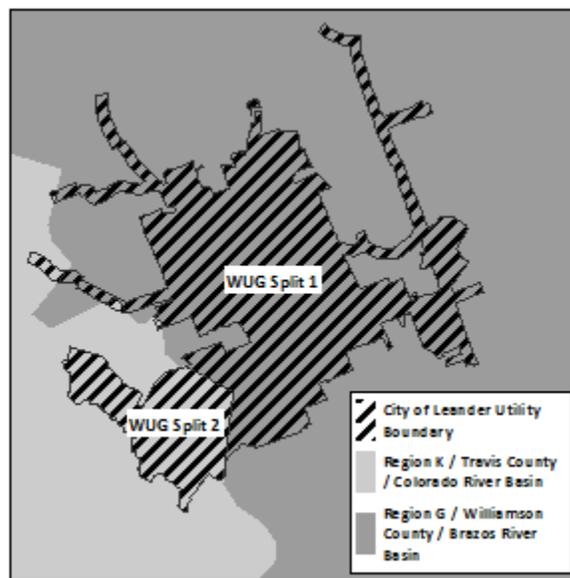
4.1.1 WUGs

The ‘WUG’ *Entity Type* represents an identified user or group of users for which water demands and existing water supplies have been identified and analyzed, and plans developed to meet water supply needs. For the full definition of a WUG, see 31 TAC § 357.10(42).

WUGs are further categorized into the following WUG types: ‘Irrigation’, ‘Livestock’, ‘Manufacturing’, ‘Mining’, ‘Municipal’, and ‘Steam Electric Power’. With the exception of municipal water use, all other categories of use are aggregations of water users associated with the WUG type grouped by the county they are located in. Municipal WUGs are subdivided into the categories: ‘Utilities’, ‘Collective Reporting Units’ (CRUs), and ‘County-Other’. CRUs are defined as a grouping of utilities located in an RWPA. For the full definition see 31 TAC § 357.10(5). Similar to non-municipal WUGs, County-Other WUGs represent the aggregation of utilities and individual water users within a county that are not identified in 31 TAC § 357.10(42) (A)-(D).

WUGs that lie in one or more counties, RWPA, or river basins must have data reported for each river basin, RWPA, and/or county split as stated in 31 TAC § 357.31. In DB22, data is required to be entered for both the WUG as a whole and its geographic WUG splits in order to report the WUG data as mandated. For example, the City of Leander as a whole WUG is divided into two WUG splits because the WUG boundary is located in two different RWPA, counties, and basins (See Figure 2).

Figure 2. Split WUG Geographic Boundary Example



At the discretion of each RWPG, certain WUG splits may be subdivided into sub-WUG level units to account for significant water users in their planning area that are combined into a county aggregated WUG such as ‘county-other’. See Exhibit C Section 2.2, for additional guidance on when and how to request a sub-WUG. In DB22, a sub-WUG will display as an additional WUG split record. A column named *WUG Detail* will include a short description of the sub-WUG and will display in RWP reports produced by the TWDB so that population, water demand, water supplies, and needs can be reported for the sub-WUG. See Table 2, for an example of how a sub-WUG would appear in the database, if added to the WUG, County-Other, Travis in the Colorado River Basin.

Table 2. Split WUG Database Example

| Record Type | Entity WUG Name | WUG Detail | WUG Split Region | WUG Split County | WUG Split Basin |
|-------------|----------------------|-----------------|------------------|------------------|-----------------|
| Whole WUG | County-Other, Travis | | | | |
| WUG Split 1 | County-Other, Travis | | K | Travis | Guadalupe |
| WUG Split 2 | County-Other, Travis | | K | Travis | Colorado |
| WUG Split 3 | County-Other, Travis | Example Sub-WUG | K | Travis | Colorado |

4.1.2 WWPs

The ‘WWP’ *Entity Type* represents any person or entity, including river authorities and irrigation districts, that deliver or sell water wholesale (treated or raw) to WUGs or other WWPs or that the RWPG expects or recommends to deliver or sell water wholesale to WUGs or other WWPs during the period of time covered by the plan.

4.1.3 WUG/WWP

The ‘WUG/WWP’ *Entity Type* represents entities that are considered both a WUG and a WWP, in that they provide water to retail users as well as sell water wholesale to other entities.

4.1.4 WUG/Seller

The ‘WUG/Seller’ *Entity Type* also sells water to other entities, but entities with this *Entity Type* are not considered WWPs. An example of this concept is a municipal utility WUG that sells retail water to their manufacturing category, whose water use is accounted for under the county aggregated manufacturing WUG entity. The municipal utility will appear to sell water to another entity, but the purchase is part of their retail sales. ‘WUG/Seller’ entities function just like ‘WUG/WWP’ entities in the DB22 application.

4.2 Entity Update Requests

The list of entities designated as WUGs is prepared by the TWDB with input from the RWPGs. The addition of sub-WUGs can also be requested by an RWPG during the WUG list finalization process. See Exhibit C Section 2.1 for more information regarding the WUG development and review process.

It is the responsibility of each RWPG to provide a list of WWP entities to the TWDB that have not already been designated as WUGs during the WUG development and review process. The RWPG will also need to review the final list of WUGs and identify whether any of these WUG entities would qualify to be further designated as a ‘WUG/WWP’ or a ‘WUG/Seller’ as defined in Section 4.1; and if yes, the RWPG will need to provide this list to WSSA staff. Once the final WUG list is established through the projection development process and uploaded into DB22 by WSSA staff, RWPG consultants may only request the addition or removal of entities that have a ‘WWP’ entity type. They may also request an update to a WUG’s entity type as long as the entity remains a WUG. For example, an entity type can be updated from a ‘WUG/WWP’ to ‘WUG’.

4.3 Major Water Providers

Major Water Provider (MWP) is a new label for entities this planning cycle. It is defined as an entity of particular significance to a region’s water supply. The RWPG determines whether the WUG or WWP entity should be labeled as an MWP in the RWP. Once the MWP list is submitted to TWDB staff, a column in the DB22 entity table will identify entities considered MWPs. The MWP entity label will be

used to summarize demands, sales, existing WUG supply, and WMS data related to WUGs and WWPs in the RWPs.

4.4 Entity Primary Region

Each entity is assigned a primary planning region in DB22 and application users with access to the entity's primary region will be responsible for all DB22 data entry associated with that entity and will be able to add, edit, and delete data related to water supply and sales. The primary region assignment methodology depends upon the entity's type. Entities that are only a WWP are assigned a primary region based on input from RWPGs. Municipal WUGs are assigned a primary region based on the region with the largest portion of the WUG's total population. Non-municipal WUGs, such as irrigation WUGs, are assigned a primary region based on the region with the largest portion of the WUG's water demand. It is important for RWPGs that plan for the same WUGs coordinate their data entry process early in the planning cycle to avoid conflicts.

4.5 WUG Projection Data

The TWDB adopted WUG population and water demand (acre-feet/year) projections will be included in the DB22 Entity Module's *WUG Projections* application page for entities with an entity type of 'WUG', 'WUG/Seller', or 'WUG/WWP'. The projections data is uploaded into DB22 by TWDB staff and is not editable by RWPGs. This data will also include: water efficiency savings (gallons) and GPCD (gallons). See Exhibit C Section 2 for more information on the development of the WUG population and water demand projections.

4.6 Entity Existing Water Use & Sales Transaction Types

Existing Source Availability is related to entities through the following DB22 Entities module application pages: *Direct Source Volume-In*, *Entity Sales/Transfers*, and *Existing WUG Supplies*. These pages demonstrate how water supplies are acquired by an entity and allocated to WUGs and WUG splits as existing WUG supplies. The DB22 Entities module displays information automatically on these pages based on how relationships are established to maintain data integrity and increase the efficiency of data entry. Each of the entity module water transaction types are listed below along with information on what data is required and how the data entered relates to the other DB22 Entities module application pages. See Appendix 5 for a diagram that demonstrates how the Entities module water transaction types relate to each other.

4.6.1 Direct Source Volume-In

The *Direct Source Volume-In* type of transaction represents the existing source availability water volume an entity has legal rights to even if it does not have the infrastructure in place to be able to use it or sell it. However, in a few cases the entity may not have legal rights to the water, but acts as a pass through to the entity that does have legal rights. For example, in Region M, there are entities that have water right permits for the Amistad-Falcon Reservoir System and they use the irrigation districts' canals to convey or transfer their water to them. To show this transfer of water, the appropriate irrigation district is entered as the direct source water volume-in recipient entity rather than the entity that holds the water right permit. The decision of which entity to enter as the recipient of the *Direct Source Volume-In* supply can vary depending upon how the RWPG wants to report the data, however this transaction type assignment should be applied consistently in the region's data.

The *Direct Source Volume-In* is entered into the DB22 Entity module's *Entity Direct Source Volume-In* application page and this page is accessible to all entity types. The entity receiving the *Direct Source*

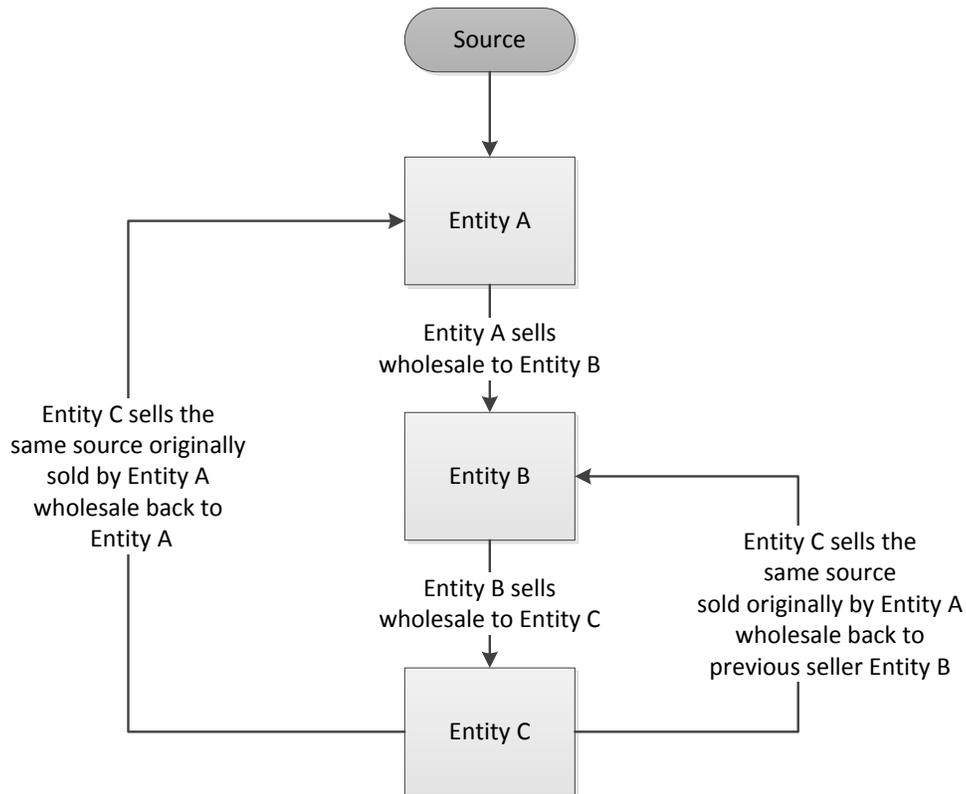
Volume-In will relate to the existing source of supply that was entered in the DB22 *Sources* module. Once a source is selected, the amount of *Direct Source Volume-In* supply it receives from the source is entered by planning decade in acre-feet. Comments may be provided in the comments field to help explain water right permits, water losses, or other information that may be helpful when reviewing the data. In the case of the Region M example above, the irrigation district that transfers water to other entities will deduct both its permitted amount and the amount permitted to the entity it is transferring water to. The same applies for WWPs and sellers that sell water to other entities. The WWP or seller will enter the total *Direct Source Volume-In* that they plan to use as existing WUG supplies (if they are a WUG) and sell to other entities (if they are a WWP or seller). If the entity is just a WUG, they will deduct the total amount they can directly receive from the source which will include the water volume they plan to use as existing WUG supplies. Only entities that directly receive water from the source should enter supply volumes in the *Entity Direct Source Volume-In* application page. If water is received from another entity, the transfer of water will be entered in the DB22 Entities module *Entity Sales/Transfers* application page. *Direct Source Volume-In* data is primarily used for calculating source water balances in DB22 and is not reported in the RWP or the SWP.

4.6.2 Entity Sales/Transfers

The entity sales/transfers type of transaction represents an entity that sells or transfer water to another entity. This water transaction is added in the DB22 Entities module *Entity Sales/Transfers* application page for entities with an entity type of ‘WWP’, ‘WUG/Seller’, or ‘WUG/WWP’. Each entity that receives water from the seller or entity transferring the water is added as a wholesale buyer. Data is then collected on the buyer’s contract demand, total sales, and sales by source. This data is used to analyze water transfers between entities and to ensure that an entity has enough water to supply to customers based on their contracted demands.

The DB22 application is designed to automatically populate data to increase data entry efficiency and maintain consistency. For example, when a buyer is connected to a seller, all sources that the seller has acquired through either *Direct Source Volume-In* or purchases from other entities will automatically display when the buyer name is selected in the *Entity Sales/Transfers* page. The application user can deselect any of the sources that it does not plan to sell or transfer to that specific buyer. In order for the application to populate the data without creating an endless loop if the entity attempts to sell or transfer water wholesale back to an entity that had previously sold the water to them, two buttons are available in the *Entity Sales/Transfers* page to differentiate between a first-time purchase of water and when the water is being sold back to the entity who previously sold it. Primarily the DB22 application user will click the button labeled **Add Wholesale Buyer**, which represents the water initially being sold from a seller entity to a buyer entity. The button labeled **Sell Back Wholesale to Previous Seller** represents a sale to an entity that previously sold the water and is now getting it back. When the **Sell Back Wholesale to Previous Seller** is selected, the water can be purchased, but not sold again to another entity in order to prevent the endless data loop from occurring. See Figure 3 for an example of the data structure involved with selling wholesale back to a previous seller. Selling water back to a previous WWP should occur rarely in DB22 since WUGs are now based on utility boundaries rather than municipal boundaries.

Figure 3. Entity selling back wholesale to another entity data structure



The following fields are collected for both types of purchases:

- **Future Customer Only:** The customer list created for a seller in the DB22 Entities module *Entity Sales/Transfer* application page is utilized by an automated tool in the DB22 WMS module that will add all customers of a seller as WMS WUG supply recipients to a WMS at the same time. During data entry into the DB17 database, some consultants chose to add future customers in the *Entity Sales/Transfers* application page, which was meant to represent current sales, so that their current and future customers could be added through the WMS module tool. However, this practice resulted in these future customers showing up in the DB17 application’s data checks query because they were not associated with any values in the existing sales data fields. To address these future customers more efficiently, the *Future Customer Only* checkbox has been added to DB22. When this checkbox is selected indicating that the buyer is a future only customer, no other data fields need to be populated. When it is left unchecked, which is the default setting, current sales information must be provided.
- **Contract Demand:** Contract demand is entered by planning decade in acre-feet. This water volume represents the amount of water the buyer plans to receive based on the contract executed between the buyer and the seller. If the entity is just transferring water to another entity without a purchase transaction and no contract exists, then the contract demand will be zero in all decades.
- **Contract Expiration Date:** The contract expiration date will be entered by month, day, and year. If the contract is assumed to be renewable or the transaction is just a non-purchase transfer, a date of 12/31/9999 must be entered.
- **Buyer/Seller Relationship Comments:** Comments regarding the buyer/seller relationship and contracts are entered into this field.

- **Total Sale Amount:** The total sales volume that represents the amount currently sold to the buyer entity, by planning decade, in acre-feet.
- **Sale Amount by Source:** The sales volume that represents the volume of water the buyer will receive from the seller from each of the identified contracted water sources, by planning decade in acre-feet. If the seller has acquired the source from more than one entity that originally acquired the water as *Direct Source Volume-In*, then the source will display more than once. Tracking these water volumes in this manner allows the source over-allocation checks to occur at each level of transfer. If the buyer will not receive a source, then it is very important to leave the decadal water volumes blank and uncheck checkbox located next to the source indicating that the source will not be sold. By doing this, the application user will minimize the amount of data check errors they will need to address. The sum of all water volumes sold by source must equal the total sale amount in each decade.
- **Sale Amount by Source Comments:** Comments regarding the buyer/seller/ source combination are entered in this field.

4.6.3 Entity WUG Supply

Entity WUG supply represents the maximum amount of water that is physically and legally accessible from an existing source for immediate use by a WUG under a repeat drought of record conditions. This information is entered into the DB22 Entities module's Entity WUG Supply application page for entities with an entity type of 'WUG', 'WUG/Seller', or 'WUG/WWP'. For more information on how to determine existing water supplies for WUGs, see Exhibit C Section 3.7. Sources are added to the Entity WUG Supply application page based on the list of sources the entity has acquired through either *Direct Source Volume-In* or purchased volumes from other entities (*Purchased Volume-In*). The application user can deselect any of the sources that it does not plan to use as existing WUG supply. Data for the following fields are collected for entity existing WUG supply:

- **Whole WUG Supply:** The whole WUG supply is entered by planning decade in acre-feet/year and represents the annual volume of water the entity receives from the combination of the source, the entity directly accessing the source, and the WUG's seller.
- **Split WUG Supply:** The split WUG supply is entered by planning decade in acre-feet/year and represents the annual volume of water each entity WUG split receives from the combination of the source, the entity directly accessing the source, and the WUG's seller. If the WUG split will not receive an annual volume of water from the specific combination listed, it is very important to leave the decadal water volumes blank and uncheck the checkbox located next to it to indicate that the WUG split will not receive water from the source. By doing this, the application user will minimize the amount of data check errors they will need to address. The sum of all split WUG supply volumes must equal the whole WUG supply volume related to the combination of the source, the entity directly accessing the source, and the WUG's seller.
- **Limiting Factor:** Limiting factor represents a current condition that restricts the amount of an existing supply that the WUG can receive from a source. A selection will be chosen from a drop-down list associated with the *Limiting Factor* field. The limiting factor options include the following:
 - 'Supplies or fractions of supplies available from reservoirs or surface water components of systems'
 - 'Current well field capacities'
 - 'Hydrogeologic properties of aquifers'
 - 'Water quality'
 - 'Current water rights, permits, or other applicable regulatory restrictions'

- ‘Current contracts and/or option agreements’
- ‘Existing conveyance infrastructure’
- ‘Water treatment plant capacity’
- ‘Obligations that WUGs may have in terms of contracts or direct and indirect water sales to other water user groups’
- ‘Other. If supply is limited by none of the above or a combination of the above, explicitly state the most restrictive limitation(s) in the “Comments” field.’
- **WUG Supply Comments:** Comments regarding the whole WUG and split WUG existing WUG supplies are entered in the comments field. If ‘Other’ is selected from the limiting factor drop-down list, explicitly state the most restrictive limitation(s) in this field. When sources are being used conjunctively, please note which sources are being conjunctively used in the whole WUG comments fields. When a WUG’s existing supply source is labeled as ‘fresh/brackish’ or ‘brackish/saline’, add information about the salinity level of the source in the WUG supply comments field.

4.7 Over-allocating Entity Supply

RWPGs should not over-allocate an entity’s directly accessed or purchased water supplies on a temporary or permanent basis. This means that the amount of water being sold to another entity or used as its own existing WUG supplies must not exceed the amount of water they received from the source through *Direct Source Volume-In* and/or purchases from other entities.

4.8 Existing Supplies Surface Water Interbasin Transfers

As stated above in Section 4.6.3, if a WUG split will not receive water supply from a source that is related to the whole WUG, it is very important to leave the decadal water volume amounts blank and uncheck the checkbox located next to it to indicate that the WUG split will not receive water from the source. This approach will ensure that the correct existing supply data is being labeled as an interbasin transfer (IBT) in the DB22 data summaries.

4.9 Entity Surplus

An entity is considered to have an annual surplus in a given decade when the total annual volume of water it receives from a source as *Direct Source Volume-In* and/or purchases is greater than the sum of the annual volumes that it allocates as sales to other entities and its own WUG supplies. Water volumes related to the entity as “entity surplus” are not reported in the RWP or the SWP since they may also include water losses or non-revenue water. See Section 4.11 for how entity surplus is utilized in the DB22 WMS module. Entity surpluses may represent

- permitted water that is lost in transmission and/or treatment,
- permitted water that is not currently accessible due to infrastructure constraints, or
- water that is legally and physically available and will be sold to future customers as part of a WMS.

4.10 WUG Water Needs/Surplus

To calculate a WUG’s needs and/or surpluses by planning decade, deduct the WUG split’s projected annual water demand volumes from the WUG split’s total annual existing supply volumes. A positive result identifies unused “surplus” water; a negative result identifies that there are not enough existing supplies to meet the WUG split’s projected demands, thus identifying a “need” or shortage. When WUG

split needs are summarized at the entity, region, county, basin, or state level, all calculated surpluses at the WUG split level are first updated to zero to ensure that the surpluses associated with one WUG split do not cancel out an identified need in another. When only the decadal WUG needs are summarized, they are displayed as a positive number.

4.11 Use of Entities Module Data in WMS Module

Although a WMS supply volume is not entered into the DB22 Entities module, data entered into the DB22 Entities module is sometimes used in the DB22 WMS module. When an entity has an entity surplus as explained in Section 4.9, this surplus water volume can be allocated to WUGs as WMS supplies by setting up a WMS that utilizes the entity surplus. If a WUG is reducing the water they receive from a source as existing water supplies and plans to acquire water from a new source of supply, then the existing WUG supply can be reduced through a WMS and left as a supply reduction or water that is reduced by one WUG could be transferred to another WUG for future use via a WMS. Projected WUG demands can also be reduced through a WMS to reflect conservation efforts. For more information on how to set up a WMS using water volumes entered into the DB22 Entities module, see Section 5.1.1.

4.12 Water Losses Related to Transferring Existing Supplies

The *Direct Source Volume-In* or *Purchase Volume-In* should represent the total water volume an entity receives from a source including any water loss that occurs during conveyance, treatment, and distribution. Projected demands associated with utility WUGs include water losses since they are based on the water uses survey's net use water volume which is calculated by deducting the wholesale water volume associated with the utility from the intake water volume. Any water losses incurred by the WUG utility should be included with its existing WUG supply water volumes. WUG retail system water loss prevention strategies should be entered as a demand reduction WMS in the WMS module. See Section 5.1.1.1 for more information on how to set up a Demand Reduction WMS. Water losses associated with wholesale water provider transfers should remain with the *Direct Source Volume-In* or *Purchased Volume-In* of the entity that is responsible for the distribution of the water to the other entities. In these cases, water losses will be represented as part of entity surpluses in the database, which are explained in Section 4.9. Water volumes identified as lost during transfers can then be made available as future WUG supply through an entity surplus WMS when a project is planned to increase the efficiency of the conveyance system. If there is a question about how to account for water losses related to an entity, please contact TWDB WSSA staff.

5 Data for Water Management Strategies & Projects

This section describes the information found in the WMS module of the DB22 data entry application. The WMS module is used to enter information related to entities' proposed plans to meet current and future WUG water supply needs that are projected to occur under a repeat drought of record. These plans are referred to as water management strategies (WMSs) and many of them require capital cost WMS projects (WMSPs) that must be funded and implemented for WUGs to receive their WMS supply.

The WMS module collects data on existing and future water sources used by WMSs to ensure they will not be over-allocated after all recommended WMSs are implemented throughout the state. WMS supply is entered by WUG split so that it can be quantified and used to ensure that the WUG split's needs are being met. WMSP capital costs are entered so that the state can plan for future water supply project funding requests. For more information regarding the selection of WMSs and WMSPs, see Exhibit C Section 5.

5.1 WMS

To meet the water supply needs of the entire state, a variety of WMSs are required. In DB22, WMSs are assigned to multiple categories in order to calculate water supply balances and summarize the WMS data. This section and its related subsections will provide instructions on how to accurately assign WMSs to their appropriate categories to ensure that they are reported correctly. Listed below are the fields that collect and display data for all categories of WMSs in the DB22 WMS module's WMS Edit/Create application page:

- **DB22 WMS Type:** Data for the *DB22 WMS Type* field is entered when the DB22 application user adds a new WMS and chooses if it will be a 'Source WMS' or an 'Entity WMS.' A WMS with a *DB22 WMS Type* of 'Source WMS' is selected when the WMS supply volume is associated with existing source availability that has not been allocated to entities, an increase/decrease in an existing source's availability, or a future source of supply. See Section 3 for additional information on Source related data. An 'Entity WMS' is selected if the WMS supply volume is associated with the transfer of an entity's surplus supply, the reduction and potential transfer of a WUG's existing supply, or a reduction in a WUG's projected demand. See Section 4 for additional information on Entity related data. The *DB22 WMS Type* is not reported in the RWP or SWP. It is used by DB22 to display information for the application user. Once a *DB22 WMS Type* is selected, it cannot be changed.
- **WMS Source Use Type:** *WMS Source Use Type* describes how the DB22 WMS module interacts with data in the DB22 Entities and Sources modules and allows the application to calculate water balances at all levels of water supply transactions to ensure that over-allocations do not occur. When the *DB22 WMS Type* selected is 'Source WMS', the *WMS Source Use Type* choices are: 'Availability Decrease', 'Existing Availability', and 'Availability Increase'. When the *DB22 WMS Type* selected is 'Entity WMS', the *WMS Source Use Type* choices are: 'Demand Reduction', 'Existing Surplus', 'Supply Reduction by WUG', and 'Supply Reduction by WWP Customers.' More information on how to choose a *WMS Source Use Type* is provided in Sections 5.1.1–5.1.2. Once a *WMS Source Use Type* is selected, it cannot be changed. Each DB22 WMS can have only one *WMS Source Use Type* associated with it. If a region's WMS requires more than one *WMS Source Use Type*, a DB22 WMS must be entered for each *WMS Source Use Type*. DB22 WMSs can then be grouped together in a *WMS Group* as described in Section 5.5 to demonstrate that they are related in the RWP.
- **WMS Name:** The *WMS Name* is a brief description of the WMS used when reporting the data that should closely match the name given to the WMS in the RWP. Each region should have a unique list of *WMS Names*. It is recommended that abbreviations and acronyms be used sparingly, and only if they are needed due to space constraints. If used, abbreviations or acronyms should be well recognized, add to the general description, or be a standard acronym for an entity name. Single quotes and ampersands should never be used in WMS names because they interfere with database querying. All numbers should be entered as numerals without any special characters. Please do not use roman numerals, pound signs, or the abbreviation 'No.' when referencing numbers. For example, UTILITY WTP EXPANSION #1 should be UTILITY EXPANSION 1.
- **WMS Sponsor Region:** The *WMS Sponsor Region* should represent the primary region engaged in developing the WMS. The WMS sources and WUG recipients of the WMS supply can come from multiple regions, but only one region will have the responsibility of entering the WMS and its WMS supply volumes. DB22 application users with access to the *WMS Sponsor Region* will be able to edit the *WMS Name*, the WMS level *Recommendation Type*, WMS level *Unit Costs*, and

will add related entities and/or sources to the WMS depending upon the *WMS Source Use Type* selected. The *WMS Sponsor Region* will also be able to relate the WMS to a WMSP (as described in Section 5.7.3) and add the WMS to a *WMS Group* (as described in Section 5.5).

- **WMS Recommendation Type:** When a WMS is initially created, the *WMS Recommendation Type* will default to ‘Recommended’. When entities and/or sources are related to the WMS as WMS supply and WUGs are added as recipients of the WMS supply, their records will be assigned the same *WMS Recommendation Type* value. Changing the *WMS Recommendation Type* to ‘Alternative’ at the WMS level will change the *WMS Recommendation Type* for all related entities and/or sources that will provide the WMS supply and the WUGs receiving the WMS supply. It is advised that if a WMS has both ‘Recommended’ and ‘Alternative’ versions, then a separate DB22 WMS must be entered for each *WMS Recommendation Type*. The *WMS Names* can be similar to reflect the relationship, but the alternative version should have a *WMS Name* that includes “ALT” to identify it as the alternative WMS.
- **WMS Unit Cost:** The *WMS Level Unit Cost* should represent the online decade’s development cost of the water prior to distribution to WUGs. Unit costs are calculated by dividing a planning decade’s annual cost (2018 dollars) by the same decade’s WMS supply. Unit costs may include the following expenditures: operations, power cost, purchased water, and debt service.
- **Remarks:** Comments regarding the WMS are entered into the *Remarks* field. These comments are especially useful when more than one WMS must be added to enter data for the RWPA’s plan to meet a WUG’s water supply needs. Explaining how the WMSs are related will assist with the review of the data.

5.1.1 WMS Source Use Types associated with existing sources

A WMS associated with an existing source represents a plan to allocate, reallocate, or increase the availability of the existing source. It can also represent a plan to reduce the consumption of existing source availability through a WMS. These types of WMS can include: building infrastructure that allows for new utilization of existing source availability, future sales of entity existing supply to new customers, redistribution of source availability across WUGs, increasing the availability of an existing source, and reducing a WUG’s dependence upon a source.

5.1.1.1 Demand Reduction WMS

A ‘Demand Reduction’ WMS reduces a WUG’s projected demand through efforts such as a reduction in water consumption through active conservation measures, drought management, and water loss prevention in public water supply systems. Reuse water supply should not be included in conservation WMS supply as it is considered a stand-alone water source type which is entered separately from conservation as stated in Exhibit C Section 3.4. A Demand Reduction WMS uses WUG projected water demand data from the DB22 Entities module and is categorized as a *DB22 WMS Type* of ‘WMS Entity Strategy’ in DB22. After a Demand Reduction WMS is created by selecting ‘Demand Reduction’ as the *WMS Source Use Type*, WUGs can be added to the WMS as *WUGs Reducing Projected Demands* on the DB22 WMS module’s WMS Edit/Create application page. Only WUGs may be related to a Demand Reduction WMS. A separate WMS should be created for each WUG that recommends a Demand Reduction WMS where a WMSP is required for only that WUG. If a WWP is sponsoring a WMS that will reduce the projected demands of multiple WUG customers, a single DB22 Demand Reduction WMS can be created where its WUG customers are added as *WUGs Reducing Projected Water Demands* if they all share the same WMSP. For more information on how to relate a WMSP to a WMS, see Section 5.7.3. WMS supply can be transferred from the WUG reducing their projected demand to another WUG if the water transfer is dependent upon the demand reduction WMS being implemented. See Appendix 6 for a diagram that demonstrates a potential demand reduction transfer data structure. The following fields

are collected for WMSs with a *WMS Source Use Type* of ‘Demand Reduction’ in the DB22 WMS module’s Demand Reduction application page:

- WMS Description: The *WMS Description* is chosen from a selection of values and helps describe the WMS. The two choices that may be selected for Demand Reduction WMS are ‘Conservation’ and ‘Drought Management’. Conservation measures are defined in 31 TAC § 357.10(35) as ‘practices, techniques, programs, and technologies that will protect water sources, reduce the consumption of water, reduce the loss or waste of water, or improve the efficiency in the use of water’. Drought management WMS are defined in 31 TAC § 357.10(10) as ‘measures evaluated and/or recommended in a State or Regional Water Plan that quantifies temporary reductions in demand during drought conditions.’ The *WMS Description* value will be used to summarize the WMS supply data. It is also used in conjunction with the WUG and source type fields related to the WMS to create the WMS types that are listed in the SWP. For a complete list of *WMS Description* values and how they relate to the SWP WMS Types, see Appendix 3.
- Demand Reduction WMS Unit Cost: The *Demand Reduction Unit Cost* should reflect the unit cost (2018 dollars) associated with each whole WUG reducing their demand. Unit costs are calculated by dividing a planning decade’s annual cost by the same decade’s WMS supply and may include the following expenditures: operations, power cost, and debt service.
- Total Whole WUG Demand Reduction: *Total Whole WUG Demand Reduction* represents the projected demand reduced by the whole WUG by planning decade in acre-feet. Total whole WUG demand reduction includes the volume reduced from its own projected demands and any supply transferred to another WUG that is dependent upon the Demand Reduction WMS. The *Whole WUG Demand Reduction Used* and transferred by the whole WUG must equal the whole WUG’s *Total Whole WUG Demand Reduction* in each planning decade. The *Total Whole WUG Demand Reduction* may not exceed the WUG’s projected demand.
- Total Split WUG Demand Reduction: *Total WUG Split Demand Reduction* represents the projected demand reduced by the WUG split by planning decade in acre-feet. The *Total WUG Split Demand Reduction* includes the volume reduced from its own projected demands and any supply transferred that is dependent upon the Demand Reduction WMS. The *Split WUG Demand Reduction Used* and transferred by the WUG split must equal the *Total WUG Split Demand Reduction* in each planning decade. If a WUG split will not reduce their projected demand through the WMS, the decadal volumes should remain blank and its related checkbox updated to unchecked. *Total WUG Split Demand Reduction* may not exceed the projected demand.
- Whole WUG Demand Reduction Used by this Entity: *Whole WUG Demand Reduction Used* represents the demand reduction that the whole WUG will use to reduce its own projected demands by planning decade in acre-feet. Unless the whole WUG plans to transfer water that is dependent upon the Demand Reduction WMS being implemented, the *Whole WUG Demand Reduction Used* volume and the *Total Whole WUG Demand Reduction* volume will be the same.
- Split WUG Demand Reduction Used by this Entity: *Split WUG Demand Reduction Used* represents the demand reduction that the WUG split will use to reduce its own projected demands by planning decade in acre-feet. Unless the WUG split plans to transfer water that is dependent upon the Demand Reduction WMS being implemented, *Split WUG Demand Reduction Used* volume and the *Total WUG Split Demand Reduction* volume will be the same. If a WUG split will not be reducing their projected demand, then the decadal fields should remain blank and its related checkbox updated to unchecked.
- Transferred Conserved Water Volumes: A WUG can reduce their projected demand through a demand reduction WMS to create a surplus in existing supply that can be transferred to another

WUG through the *Transfer Conserved Water Volumes* section. The default value for the field labeled *Transfer Conserved Water Volumes* is ‘No’ which means that the WUG will not be transferring supplies. By changing the value to ‘Yes’, the application will display total existing WUG supplies by source and WUG split that can be reduced and transferred. If the source will not be reduced as part of the Demand Reduction Transfer WMS, the checkbox next to the source must be unchecked. By unchecking the checkbox, the application user will minimize the amount of data check errors they will need to address.

- **Total WUG Supplies to Be Transferred:** The field labeled *Total WUG Supplies to be Transferred* represents the existing WUG supplies by source that the split WUG will be transferring to another WUG that is dependent upon the Demand Reduction WMS being implemented. This supply should be entered by planning decade in acre-feet. If a WUG split will not transfer water to another entity through the Demand Reduction WMS, the decadal fields should remain blank and its related checkbox updated to unchecked. By unchecking the checkbox, the application user will minimize the amount of data check errors they will need to address.
- **Remarks:** The *Remarks* field should contain comments regarding the Demand Reduction WMS by Whole WUG or WUG split.

5.1.1.2 Existing Surplus WMS

An ‘Existing Surplus’ WMS uses remaining entity surplus from the DB22 Entities module and is categorized as a *DB22 WMS Type ‘WMS Entity Strategy’* in DB22. Remaining entity surplus is calculated by deducting the sum of the entity’s existing WUG supplies and its sales to other entities from its total direct and *Purchased Volume-In*. See Section 4.9 for more information on how entity surplus is calculated. These WMS include the allocation of supply to existing and future WUG customers. They may also include plans to mend, replace, or line transmission infrastructure such as pipelines and canals to help prevent the loss of water when it is transferred from source to entity or from entity to entity. See Section 4.12 for more information on how water losses are accounted for in the DB22 Entities module. After an Existing Surplus WMS is created by choosing a *WMS Source Use Type* of ‘Existing Surplus’, one or more entities are added in the *Entities Transferring Volume-In Water Volumes* section. All sources that the entity receives direct or *Purchased Volume-In* from in the DB22 Entities module are listed along with their calculated entity surplus on the DB22 WMS module’s Existing Surplus application page. When entity surplus will not be transferred to WMS WUGs, the source’s related checkbox must be unchecked. See Appendix 7 for a diagram that demonstrates a potential Existing Surplus WMS data structure.

5.1.1.3 Supply Reduction by WUG WMS

A ‘Supply Reduction by WUG’ WMS is created to reduce the volume of existing supply that a WUG will receive. This reduction can involve an unreliable source, a planned transfer from one WUG to another, a transition from one source to a new source of supply, or a combination of reasons. When the WUG supply is reduced, it becomes a source of supply through the WMS that WUGs can receive as WMS supply. These types of WMS are categorized as a *DB22 WMS Type ‘WMS Entity Strategy’*, since they reduce existing WUG supply entered in the DB22 Entities module. After a WUG supply reduction WMS is created by choosing a *WMS Source Use Type* of ‘Supply Reduction by WUG’, one or more WUGs are added in the *WUGs Reducing Existing WUG Supplies* section. The sources that are related to the WUG as existing supplies in the DB22 Entities module are listed by WUG as a whole and its WUG splits. See Appendix 8 for a diagram that demonstrates a potential WUG Supply Reduction WMS data structure. The following fields are collected for WMS with a *WMS Source Use Type* of ‘Supply Reduction by WUG’ on the DB22 WMS module’s WUG Supply Reduction application page:

- **Whole WUG Supply Reduction:** *Whole WUG Supply Reduction* represents the reduction in existing WUG supplies by the whole WUG and source of supply in acre-feet for each planning decade. If a whole WUG will not be reducing their existing supplies through the WMS for a specific source, then the decadal fields should remain blank and its related checkbox must be updated to unchecked.
- **Split WUG Supply Reduction:** *WUG Split Supply Reduction* represents the reduction in WUG supplies by the WUG split and source of supply in acre-feet for each planning decade. If a WUG split will not reduce their existing supplies through the WMS for a specific source, then the decadal fields should remain blank and its related checkbox must be updated to unchecked.
- **Remarks:** The *Remarks* field should contain comments regarding the supply reduction for the associated whole WUG and its WUG split records.

5.1.1.4 WWP Customer Supply Reduction WMS

A 'Supply Reduction by WWP Customers' WMS reduces the supply of all or a select group of a WWP's customers from one or more sources. This reduction can involve the reallocation of a WWP's supply amongst their current and future customers or the transitioning from one source of supply to another. These types of WMS are categorized as a *DB22 WMS Type* 'WMS Entity Strategy', since they reduce existing WUG supply entered in the DB22 Entities module. After a WWP customer supply reduction WMS is created by choosing a *WMS Source Use Type* of 'Supply Reduction by WWP Customers', a WWP is added in the *WWP/Sellers Customers Reducing Existing WUG Supplies* section. All customers related to the WWP in the DB22 Entities module are listed with the WWP. An individual WUG customer can be unchecked if its existing WUG supply will not be reduced on the DB22 WMS module's WWP Supply Reduction application page. Clicking on the customer name will take the user to DB22 WMS Module WUG Supply Reduction application page that lists sources that are related to the WUG in the DB22 Entities module and are sold by the WWP/seller selected. WUG supply is listed by the whole WUG and for each WUG split that is sold the source by the WWP. See Appendix 9 for a diagram that demonstrates a potential WWP Customer Supply Reduction WMS data structure. The following fields are collected for WMS with a WMS source use type of 'Supply Reduction by WWP Customers' on the DB22 WMS module's WUG Supply Reduction application page:

- **Whole WUG Supply Reduction:** *Whole WUG Supply Reduction* represents the reduction in existing WUG supplies by the whole WUG customer and source of supply in acre-feet for each planning decade. If a whole WUG will not reduce their existing supplies through the WMS for a specific source, then the decadal fields must remain blank and its related checkbox updated to unchecked.
- **Split WUG Supply Reduction:** *WUG split Supply Reduction* represents the reduction in WUG supplies by the WUG split and source of supply in acre-feet for each planning decade. If a WUG split will not reduce their existing supplies through the WMS for a specific source, then the decadal fields must remain blank and its related checkbox updated to unchecked.
- **Remarks:** The *Remarks* field should contain comments regarding the customer supply reduction for the associated whole WUG customer and its WUG split records.

5.1.1.5 Existing Availability WMS

Remaining existing availability is calculated by deducting the source's total *Direct Source Volume-In* allocated to entities in the DB22 Entities module (Section 4.6.1) from the source's existing *Total Availability* entered in the DB22 Sources module (Section 3). These types of WMS allow more existing availability to be allocated to WUGs through an expansion of infrastructure and have a *DB22 WMS Type* of 'WMS Source Strategy'. After a source existing availability WMS is created by choosing a *WMS Source Use Type* of 'Existing Availability', one or more existing sources are added in the *Related Sources* section

on the DB22 WMS module WMS Edit/Create application page. WMS WUGs will then use the remaining *Total Availability* from those sources as WMS WUG supply. See Section 5.2 for more information on how to allocate WMS supply to entities. See Appendix 10 for a diagram that demonstrates a potential Existing Availability WMS data structure.

5.1.1.6 Availability Decrease WMS

An Availability Decrease WMS is typically used in conjunction with another WMS to account for the transferring of existing *Total Availability* from one source to another source through methods like the subordination of downstream water rights. These types of WMS are categorized as a *DB22 WMS Type* ‘WMS Source Strategy’, since they reduce existing source *Total Availability* entered in the DB22 Sources module. After an Availability Decrease WMS is created by choosing a *WMS Source Use Type* of ‘Availability Decrease’, one or more existing sources are added in the *Related Sources* section of the DB22 WMS module’s WMS Edit/Create application page. Since the WMS only reduces the *Total Availability* associated with an existing source, WMS WUGs cannot be related to this *WMS Source Use Type*. If the decrease in availability is transferred to another source as part of the overall plan, a separate WMS with a *WMS Source Use Type* of ‘Availability Increase’ will be created to represent the increase in availability of the other source and will relate to the WMS WUGs that will benefit from the WMS supply associated with the Availability Increase WMS. The WMSs can then be grouped together in a *WMS Group* as described in Section 5.5 to demonstrate that they are related in the RWP. See Appendix 11 for a diagram that demonstrates a potential Availability Decrease WMS data structure. The following fields are collected for WMS with a *WMS Source Use Type* of ‘Availability Decrease’ in the DB22 WMS Module’s Future Availability application page:

- **Future Total Availability Decrease:** *Future Total Availability Decrease* represents water that is deducted from a source’s existing *Total Availability* by planning decade in acre-feet.
- **Conservation Pool Decrease:** This value is only collected for WMS with a *WMS Source Use Type* of ‘Availability Decrease’ when the related source is a reservoir. If the implementation of the ‘Availability Decrease’ WMS decreases the *Conservation Pool* of the reservoir, then the volume in acre-feet that the *Conservation Pool* will decrease will be entered in this field. If no change is made to the existing source’s *Conservation Pool*, a value of zero will be entered.
- **Future Firm Yield Decrease:** If the *Future Total Availability Decrease* does not represent the firm availability as specified in Exhibit C Section 3.2 (i.e., not the standard WAM Run 3 firm yield), then the *Future Firm Availability Decrease* (acre-feet) derived from an approved hydrologic variance must also be entered for the existing reservoir. To enter the *Future Firm Availability Decrease* related to the reservoir when the availability is not based on firm yield, select the ‘N’ value on the field *Is future total availability based on firm yield?* and click the **Update** button on the Future Availability page of the DB22 WMS module for the specified reservoir. A *Firm Yield* decadal water volume column will then display for each planning decade and must be filled out. When an Availability Decrease WMS is added for an existing reservoir, the *Is future total availability based on firm yield?* value should match the *Is total availability based on firm yield?* value entered in the DB22 Sources module.
- **Remarks:** The *Remarks* field should contain information explaining why the source’s availability is being decreased, if it is being implemented with another WMS, a brief explanation on how they work together.

5.1.1.7 Availability Increase associated with an existing source

An availability increase of an existing source represents a plan to develop new source availability that is not already included as existing *Total Availability* in the DB22 Sources module. Examples of increases in the *Total Availability* of existing sources are: conservation pool reallocation, reservoir augmentation,

improved systems operations, brush control, and artificial aquifer recharge when it is not related to new reuse supply. An Availability Increase WMS uses source data from the DB22 Sources module and is categorized as a *DB22 WMS Type* 'WMS Source Strategy'. After an Availability Increase WMS is created by choosing a *WMS Source Use Type* of 'Availability Increase', one or more existing sources whose *Total Availability* is being increased is added to the WMS as *Related Sources* in the DB22 WMS Module's Future Availability application page. The source benefitting from the Availability Increase WMS must be added. For example, when entering a WMS that includes brush control, the source that will benefit from the vegetation removal will be added to the WMS and the firm yield increase that will result from implementing the WMS will be added. See Appendix 12 for a diagram that demonstrates a potential Availability Increase associated with an existing source WMS data structure. The following fields are collected for WMS with a *WMS Source Use Type* of 'Availability Increase' in the DB22 WMS Module's Future Availability application page when the source added is an existing source:

- **Future Total Availability Increase:** *Future Total Availability Increase* represents the additional water developed through the WMS by planning decade in acre-feet that is in addition to the existing *Total Availability* entered in the DB22 Source module. The *Future Total Availability Increase* associated with the source should represent the full volume of water that will be developed through the WMS which includes supply allocated to WMS WUG that will benefit from the WMS, the volume that is developed and not allocated to a specific WUG, and estimated water loss related to the WMS. Water will be allocated to those three categories through the DB22 WMS module's WMS WUG Supply Edit/Create application page.
- **Conservation Pool Increase:** This value is only collected for WMS with a *WMS Source Use Type* of 'Availability Increase' when the related source is a reservoir. When the WMS is increasing the availability of an existing reservoir source, the *Conservation Pool Increase* shall reflect the volume that the *Conservation Pool capacity* is increasing in acre-feet as a result of the WMS and not the total new *Conservation Pool* water volume. If no change is made to the existing source's *Conservation Pool*, a value of zero will be entered.
- **Future Firm Yield Increase:** This value is only collected for WMS with a *WMS Source Use Type* of 'Availability Increase' when the related source is a reservoir. If the *Future Total Availability Increase* does not represent the firm availability as specified in Exhibit C Section 3.2 (i.e., not the standard WAM Run 3 firm yield), then the *Future Firm Availability Increase* (acre-feet) derived from an approved hydrologic variance must also be entered for the existing reservoir. To enter *Future Firm Availability Increase* related to the reservoir when the availability is not based on firm yield, select the 'N' value on the field *Is future total availability based on firm yield?* and click the **Update** button on the Future Availability application page of the DB22 WMS module for the specified reservoir. A *Firm Yield* decadal water volume column will then display for each planning decade and must be updated. Please specify in the *Remarks* field additional information regarding the proposed hydrologic variance request including a brief description such as 'addition of return flows' or 'reservoir safe yield'. For a complete list of examples from past plans of potentially appropriate surface water modeling assumptions for RWP development, see Exhibit C Section 3.6.2. When an Availability Increase WMS is added for an existing reservoir, the *Is future total availability based on firm yield?* value should match the *Is total availability based on firm yield?* value entered in the DB22 Sources module.
- **Remarks:** The *Remarks* field should contain comments regarding the increase in availability of the existing source. It should also contain additional information regarding the proposed hydrologic variance request as necessary.

5.1.2 WMS Source Use Types associated with future sources

A future source WMS represents a plan to develop new source availability that is not already included as existing *Total Availability* in the DB22 Sources module. Examples of future sources include new reuse, ASR, rainwater harvesting, and reservoirs. This category also includes potential increases in water supply as a result of weather modification WMS. See Exhibit C Section 3.3.8 for more information on how to add a weather modification source. An Availability Increase WMS uses source data from the DB22 Sources module and is categorized as a ‘WMS Source Strategy’ in DB22. After an Availability Increase WMS is created by choosing a *WMS Source Use Type* of ‘Availability Increase’, one or more future sources are added to the WMS as *Related Sources*. Each new reservoir must be entered as a distinct WMS in DB22 with just the one new reservoir related to the WMS. For example, the WMS Name would be entered as something like ‘Development of Reservoir X’ and the only reservoir attached to the WMS is Reservoir X. By entering new reservoir WMS into DB22 using this method, the data can be reported consistently across all regions. It also allows the WMSP representing the cost of the new reservoir development to be connected with just the new reservoir WMS and its related WMS WUG supply recipients at the WMS level. Relating a WMSP to a WMS is covered in Section 5.7.3. If the development of the new reservoir is related to other WMS like the conveyance of existing availability, these WMS can be added to a *WMS Group* as described in Section 5.5. See Appendix 13 for a diagram that demonstrates a potential Availability Increase associated with a new source WMS data structure. The following fields are collected for WMS with a *WMS Source Use Type* of ‘Availability Increase’ in the DB22 WMS Module’s Future Availability application page when the source added is a new source:

- **Future Total Availability Increase:** *Future Total Availability Increase* represents the additional water developed through the WMS by planning decade in acre-feet associated with the future source. The *Future Total Availability Increase* associated with the source should represent the full volume of water that will be developed through the WMS which includes supply allocated to WMS WUG that will benefit from the WMS, the volume that is developed and not allocated to a specific WUG, and estimated water loss related to the WMS. Water will be allocated to those three categories through the DB22 WMS module’s WMS WUG Supply Edit/Create application page.
- **Conservation Pool Increase:** This value is only collected for WMS with a *WMS Source Use Type* of ‘Availability Increase’ when the related source is a reservoir. When the WMS is developing a new reservoir, it should reflect the planned conservation pool capacity of the new source in acre-feet.
- **Future Firm Yield Increase:** This value is only collected for WMS with a *WMS Source Use Type* of ‘Availability Increase’ when the related source is a reservoir. If the *Future Total Availability Increase* does not represent the firm availability as specified in Exhibit C Section 3.2 (i.e., not the standard WAM Run 3 firm yield), then the *Future Firm Availability Increase* (acre-feet) derived from an approved hydrologic variance must also be entered for the existing reservoir. To enter *Future Firm Availability Increase* related to the reservoir when the availability is not based on firm yield, select the ‘N’ value on the field *Is future total availability based on firm yield?* and click the **Update** button on the Future Availability application page of the DB22 WMS module for the specified reservoir. A *Firm Yield* decadal water volume column will then display for each planning decade and must be updated. Please specify in the *Remarks* field additional information regarding the proposed hydrologic variance request including a brief description such as ‘addition of return flows’ or ‘reservoir safe yield’. For a complete list of examples from past plans of potentially appropriate surface water modeling assumptions for RWP development, see Exhibit C Section 3.6.2.

- Remarks: The *Remarks* field should contain comments regarding the future source. It should also contain additional information regarding the proposed hydrologic variance request as necessary.

5.2 Allocating WMS Supply to Entities and Assigning WMS Water Losses

WMS supply is allocated to WUGs to meet the WUG’s projected needs and ensure that it will have a reliable source of supply. WUGs can be related to a WMS when a source of supply has been added to it through the DB22 WMS Module’s WMS Edit/Create application page. All supply created through the WMS must be allocated to WUGs through the DB22 WMS Module’s WMS WUG Supply Edit/Create application page. In addition to WMS supply allocated to WUGs as future supply, this also includes water that is considered to be lost through transmission and/or treatment and WMS supply created, but left unassigned to a WUG.

Water losses (non-revenue water) will be assigned to the entity developing the water through a ‘water loss’ entity. For example, WWP X transfers water to WUGs as part of an unallocated supply utilization WMS. Some of the transferred water volume will not reach the end users and will be entered as WMS WUG supply for the WUG labeled ‘WWP X – Water Loss.’ Since only WUG entity types display in the DB22 WMS module’s WMS WUG Supply Edit/Create page, each entity will have a water loss “faux WUG” associated with it that may be used when water loss needs to be accounted for. The entity name will include the name of the entity responsible for the water and the text ‘WATER LOSS.’ These water loss WUGs can only be used in the WMS module. See Section 4.12 for more information on how to enter water loss associated with existing water supply.

WMS supplies created through the WMS that have not been assigned to a WUG will be allocated to the entity responsible for the water through an ‘unassigned water volumes’ entity. For example, Canadian River Municipal Water Authority is sponsoring a conjunctive use WMS that includes the development of an ASR project. After water has been allocated to WUGs, the remaining supply is allocated to the ‘Canadian River Municipal Water Authority-Unassigned Water Volumes’ entity as WMS WUG supply. Since only WUG entity types display in the WMS WUG Supply page, each entity will have an unassigned water volumes “faux WUG” associated with it that may be used to account for any unassigned water volumes related to it. The entity name will include the name of the entity responsible for the water and the text ‘UNASSIGNED WATER VOLUMES.’ These unassigned water volume WUGs can only be used in the WMS module.

The following fields are collected for all types of WMS WUG Supply:

- WMS Seller Entity: The *WMS Seller Entity* should represent the WWP who is responsible for developing the WMS supply that will be used by WUG. If more than one *WMS Seller Entity* is required to transfer the water to the WUG, the initial seller associated with the development of the WMS should be listed in this field. It will be used to summarize WMS supply being developed for WUGs by each WWP. Once the seller is chosen, it cannot be changed. If you need help updating the seller associated with a WMS, please contact WSSA staff. To see an example diagram of WMS seller relationships, see Appendix 14.
- Recommendation Type: When a WUG is related to a WMS, the WUG’s default *Recommendation Type* value will be the same as the *Recommendation Type* entered for the WMS as a whole. For example, if the WMS as a whole is labeled as an alternative WMS, the WUG will also have a value of ‘Alternative’. In some cases where the WMS as a whole is recommended, there could be one or more WUGs, but not all that have chosen the WMS as an ‘Alternative’ WMS. In this instance, the *Recommendation Type* value for the WUG can be changed from ‘Recommended

‘to ‘Alternative’. When the WMS WUG’s *Recommendation Type* value is ‘alternative,’ the related WMS WUG Supply will not be used in the remaining water balance or WUG unmet needs calculations.

- **WMS Description:** The WMS description is chosen from a selection of values and helps describe the WMS. This value will be used to summarize the WMS WUG Supply data. It is also used in conjunction with the WUG and source type fields related to the WMS to create the WMS Type summaries that are listed in the SWP. For a complete list of WMS Description values and how they relate to the SWP WMS Types, see Appendix 3.
- **Treated Water:** The *Treated Water* field is a ‘Yes’/‘No’ choice that will indicate whether the WMS supply the WUG receives is treated or untreated “raw” water. The default value is ‘Y’ which identifies that the water the WUG will be receiving is treated. If the WUG receives raw water requiring additional treatment to be usable by the WUG, then the value will need to be updated to ‘N’.
- **New or amended water right related to a non-exempt IBT required?:** This field will be labeled as a ‘Y’ when the WMS WUG supply is related to an IBT that is not exempt under TWC § 11.085(v). The data collected in this field will be used to produce report numbers 18 and 19 listed in Table 13.1 of Exhibit C Section 13.1.
- **WMS WUG Unit Cost:** The *WMS WUG Level Unit Cost* should reflect the unit cost (2018 dollars) associated with the development and delivery of the water supply from the source (and its seller if the water is purchased) to the WUG, water loss entity, or unassigned water volumes entity. Unit costs are calculated by dividing a planning decade’s annual cost by the same decade’s WMS supply and may include the following expenditures: operations, power cost, purchased water, and debt service. If the whole WUG does not plan to receive water from the WMS source, then the checkbox related to the whole WUG must be unchecked to minimize the amount of data checks that will need to be addressed.
- **WMS Whole WUG Supply:** The *WMS Whole WUG Supply* represents the total water volume (acre-feet) that the whole WUG, water loss entity, or unassigned water volumes entity receives from the WMS source (and its seller when purchased) for each planning decade. This volume should include only the portion of the water supply that the WUG plans to use to meet its own current and future water demands.
- **WMS Split WUG Supply:** The *WMS WUG Split Supply* represents the total water volume (acre-feet) that the WUG split, water loss entity, or unassigned water volumes entity receives from the WMS source (and its seller when purchased) for each planning decade. This volume should include only the portion of the water supply that the WUG split plans to use to meet its current and future demands. If the WUG split does not plan to receive water from the WMS source, then the checkbox related to the WUG split must be unchecked to minimize the amount of data checks that will need to be addressed. When entering unassigned or water loss water volumes, the WUG split’s decadal values will match the whole WUG’s decadal values.
- **Remarks:** The *Remarks* field should contain comments regarding the WMS WUG supply for the associated whole WUG and WUG split records.

5.3 Over-Allocating WMS Sources

After all recommended WMS supply deductions are accounted for, no source may be over-allocated. A WMS source is considered over-allocated when the amount of supply allocated to entities as WMS WUG supply exceeds the available water volume associated with the source. The DB22 WMS WUG Supply Edit/Create application page includes calculated rows that display calculated water balances based on the *WMS Source Use Type* of the WMS. The DB22 Data Checks module also includes data checks that

ensure that the source availability, entity supply, and existing WUG supplies are not over-allocated after all existing supplies and recommended WMS supply are entered. Listed in this section are explanations of how water balances are calculated for existing availability, future source availability, entity surplus, and WUG supply transfers in both the DB22 WMS WUG Supply Edit/Create application page and the Data Checks module WMS application page. These water balance calculations assure that water supply is not being over-allocated at the source level or any level of transaction. When an over-allocation is detected, it must be resolved by reducing the amount of supply that has been allocated to WUGs.

5.3.1 Existing Source Availability Over-Allocation

A source's existing availability is over-allocated if the sum of its related *Direct Source Volume-In*, recommended availability decreases, and recommended existing availability WMS WUG supply water volumes exceed the existing *Total Availability* of the source in any planning decade. *WMS Source Use Type* 'Availability Decrease' water volumes will be reduced prior to calculating the existing source availability water balance if the associated WMS is related to a *WMS Group* where a recommended WUG supply reduction WMS is offsetting the decrease in availability.

5.3.2 Availability Increase Over-Allocation

A WMS source availability increase is over-allocated if the sum of its recommended WMS WUG supply exceeds its availability increase in any planning decade.

5.3.3 Entity Supply Over-Allocation

An entity's supply source is over-allocated if the sum of the entity's existing WUG supplies, existing sales to other entities, and recommended entity surplus WMS WUG supply exceeds its direct and *Purchased Volume-In* received from the source.

5.3.4 WUG Existing Supply Over-Allocation

A WUG's existing supply source is over-allocated if the sum of the recommended demand reduction transfer, WUG supply reduction, and WWP customer supply reduction WMS exceeds its existing WUG supply received from the source.

5.4 WMS Supplies Interbasin Transfers

As stated above in Section 5.2, if a WUG split will not receive WMS WUG supply from a WMS/source combination, it is very important to leave the decadal water volume fields blank and uncheck the related checkbox prior to allocating the whole WUG's existing supply to its geographic WUG splits. This will ensure that the correct WMS WUG supply data will be labeled as requiring a new or amended water right permit involving a non-exempt IBT in DB22 data summaries. WMS WUG supply will be labeled as a non-exempt IBT using the data collected in the DB22 WMS WUG Supply Edit/Create application page field named *New or amended water right related to a non-exempt IBT required?*. See section 5.2 for more information on how to enter WMS WUG supplies.

5.5 Grouping WMS

Two or more WMSs can be related in a *WMS Group* through the DB22 WMS module's WMS Group application page. WMSs should be added to a *WMS Group* when they are identified as a single WMS in the RWP, but must be added as multiple DB22 database WMSs to enter the data appropriately through DB22. For example, if an existing availability groundwater WMS and a new ASR project are to be used conjunctively in the RWP, two WMSs will need to be created in DB22 to account for both the 'Existing Availability' *WMS Source Use Type* and the 'Availability Increase' *WMS Source Use Type*. The two DB22

WMSs will then be added to a *WMS Group* to demonstrate that they are related and will be used conjunctively. The *WMS Group Name* should closely resemble the name given to the WMS in the RWP. It is recommended that abbreviations and acronyms be used sparingly, and only if they are needed due to space constraints. If used, abbreviations or acronyms should be well recognized, add to the general description, or be a standard acronym for an entity name. Single quotes and ampersands should never be used in WMS Group names because they interfere with database querying. All numbers should be entered as numerals without any special characters. Please do not use roman numerals, pound signs, or the abbreviation 'No.' when referencing numbers. For example, UTILITY WTP EXPANSION #1 should be UTILITY EXPANSION 1. See Appendices 11 and 14 for examples of how a WMS Group can be used to link WMS and their WMSPs.

When WMSs are added to a *WMS Group*, a *WMS Tier* value must be added. This value represents the order in which the WMS must be implemented. If all WMS associated with the *WMS Group* must be implemented at the same time, a value of '1' will be entered for each of the WMSs. If there is an order to the implementation of the WMS, then a value of '1' should be assigned to the first WMS that must be implemented, a value of '2' is assigned to the next WMS to be implemented, and so on. If there are three WMS and one WMS needs to be implemented first and the other two implemented at a later date, but at the same time, then the first WMS will be assigned a value of '1' and the other two WMSs will both receive a value of '2'.

When multiple WMS are added to a *WMS Group*, they will be reported under the *WMS Group Name* when the WMS data is summarized. When a WMS is not listed with a *WMS Group*, the *WMS Name* will be used to report the information.

5.6 Conjunctive Use WMS

When a WMS uses a combination of more than one source type or new and existing sources are blended in a WMS or WMS group, they may be considered 'Conjunctive Use.' When entering 'Conjunctive Use' WMS supply, all related WMS WUG supply must have a *WMS Description* value of 'Conjunctive Use' in order for the WMS as a whole to be reported as 'Conjunctive Use'. For more information on how to select a 'Conjunctive Use' WMS, see Exhibit C Section 5.2.1.

5.7 WMS Project

A WMSP is a water supply project that has a non-zero capital cost and when implemented will develop, deliver, and/or treat additional water supply volumes, or conserve water for WUGs and WWP. For example, a WMSP could be the construction of a new reservoir, a water treatment plant expansion, and/or a new transmission line. A WMS may not require a WMSP to be implemented if capital costs are not required to implement the WMS, but a WMSP should always be related to a WMS to demonstrate that the project is necessary for the WMS to be implemented. Relating a WMSP to a WMS also relates the WMSP to the source of supply and the WUGs it will serve in DB22. A DB22 WMSP should not be a grouping of multiple projects. Each project must be entered as a separate WMSP through the DB22 WMS module's Project Edit/Create application page and related to one or more WMS. For a project to be recommended in the SWP, a WMSP must be related to at least one WMS as recommended. For more information on project selection and cost, see Exhibit C Section 5. The following fields are collected for each WMSP:

- **Project Name:** The *Project Name* is a brief description of the WMSP used when reporting the data that should closely match the name given to the WMSP in the RWP. Each region should have a unique list of *Project Names*. It is recommended that abbreviations and acronyms be

used sparingly, and only if they are needed due to space constraints. If used, abbreviations or acronyms should be well recognized, add to the general description, or be a standard acronym for an entity name. Single quotes and ampersands should never be used in project names because they interfere with database querying. All numbers should be entered as numerals without any special characters. Please do not use roman numerals, pound signs, or the abbreviation 'No.' when referencing numbers. For example, UTILITY WTP EXPANSION #1 should be UTILITY EXPANSION 1.

- **Project Sponsor Region:** The *Project Sponsor Region* should reflect the primary region engaged in developing the WMSP. *Project Sponsors* can come from multiple regions, but only one region will have the responsibility of entering the WMSP and its related data. DB22 application users with access to the *Project Sponsor Region* will be able to edit the *Project Name*, the *Project Sponsor* information, and the project *Component* list.
- **Online Date:** The *Online Date* represents the decade that the project will be fully operational.
- **Latitude/Longitude:** The *Latitude* and *Longitude* fields should represent the proposed location of the WMSP. The basis for selecting a representative location will vary depending on the RWP and type of infrastructure but, in general, the default project locations will relate to
 - approximate locations of at least one component of major infrastructure such as dams, water treatment plants, water intakes for pipelines, or well fields proposed in the plan;
 - the primary location of the WUG in which certain types of infrastructure would be located, such as some water treatment plants within a city or water conservation investments;
 - the centroid of the county in which a project with dispersed infrastructure would be located, such as county-wide irrigation, mining, or manufacturing conservation projects; or
 - the centroid of a county-aquifer polygon for certain, generalized groundwater supply projects.

Contact the TWDB WSSA team if guidance is needed when selecting a project location.

- **Remarks:** The *Remarks* field should contain comments regarding the WMSP.

5.7.1 WMS Project Sponsors

One or more entities are related to a WMSP as *Project Sponsors*. *Project Sponsors* are responsible for developing the WMSP and acquiring funding for its implementation. The following fields are collected for each *Project Sponsor* related to a WMSP:

- **Capital Cost:** *Capital Cost* (2018 dollars) should represent the portion of the overall capital cost each WMSP sponsor entity is responsible for. WMSP sponsor *Capital Costs* are summed to the project level and reported as the total *Capital Cost* of the WMSP.
- **Term of Debt Service:** Estimated length or term of the WMSP's funding debt service, in years.
- **First Year Funding Required:** The *First Year Funding Required* is the first year that funding will be required to finance the WMSP and implement it by the planned *Online Decade*.
- **Remarks:** The *Remarks* field should contain comments regarding the *Project Sponsor* and their associated WMSP.

5.7.2 WMS Project Components

WMSP *Components* are the necessary actions or infrastructure elements required to develop, treat, and/or convey the WMS supply that the WMSP is related to. A WMSP must be related to one or more project *Components* on the DB22 WMS module's Project Edit/Create application page. For a complete

list of components see Appendix 4. It is important to review this list and select all *Components* that apply to the WMSP. This data is used to identify WMSPs that will require certain agreements and infrastructure types. For example, by choosing the *Component* type, 'Water Right/Permit Amendment Non-Exempt IBT' all projects that will require a water right amendment that involves a non-exempt IBT can be selected.

5.7.3 Relating a WMSP to a WMS

All WMSPs must relate to at least one WMS. A WMSP should only relate to WMS WUG supply that is directly impacted by the WMSP. By relating the project to the WMS and its benefitting WUGs, the population, projected demands, and water supply needs dependent upon the project's implementation can be reported.

When a project is related to a WMS as a whole, it means that all the WUGs that receive water from the WMS are dependent upon the project being operational in order for them to receive their WMS supply. A WMSP will be added to the WMS as a whole on the DB22 WMS module's WMS Edit/Create application page. WMSPs can also be related to more than one WMS if the infrastructure being built is related to more than one WMS supply. For example, a WMSP creates a new transmission pipeline and it's used to convey water from both a new reservoir and an existing run-of-river source. The new reservoir and the existing run-of-river WMSs are two different WMS in DB22, but they both require the same pipeline construction project in order to deliver the water to WUGs.

A WMSP can also be related to specific WMS WUG combinations through the DB22 WMS module's WMS WUG Supply Edit/Create application page. The relationship between the WMS WUG and the WMSP is established when at least one, but not all WUGs related to the WMS require additional infrastructure to get their water. For example, a WWP plans to allocate more of its existing surplus to WUGs. Some of the WUGs associated with the WMS have infrastructure in place to receive the additional supply with no capital cost required, but a few new WUG customers need an additional pipeline built for them to receive the supply. The customers requiring additional infrastructure would relate to the new pipeline WMSP on the WMS WUG Supply Edit/Create application page under the WMS that requires the new infrastructure. See Appendix 15 for a diagram that demonstrates the relationships between WMSs and WMSPs.

5.7.4 WMS Project Recommendation Type

When a WMSP is related at either the WMS level or the WMS WUG supply level, the relationship is assigned a default *Project Recommendation Type* value of 'Recommended'. If the WMSP is considered an alternative project for the WMS or the WMS WUG, the user must update the *Project Recommendation Type* field to 'Alternative'. If a WMSP is labeled 'Recommended' for at least one WMS at either the WMS level or the WMS WUG level, it will be considered a 'Recommended' WMSP in the SWP. If all of its relationships to a WMS are 'Alternative', then the WMSP will be considered 'Alternative' in the SWP. It is very important to review the *Recommendation Types* assigned to the WMSP to ensure that they are correct. WMS data checks will also help identify potential errors in DB22 by reviewing combinations of *Project Recommendation Types* selected.

5.7.5 WMS Project Hierarchies

When more than one WMSP is added to either a WMS or a WMS WUG, a *Project Tier* value must be entered. The *Project Tier* value represents the order in which the WMSPs must be implemented. If all WMSPs must be implemented at the same time, the *Project Tier* value will be '1' for all of them. If there is an order to the implementation of the WMSP, then a *Project Tier* value of '1' should be assigned to the first WMSP that must be implemented, a value of '2' is assigned to the next WMSP, and so on. If

three WMSPs are required to implement a WMS and one WMSP needs to be implemented first and the other two at a later date, then the first WMSP will get a *Project Tier* of '1' and the second two WMSPs will both have a value of '2.' The WMSP *Project Tier* value is entered on the DB22 WMS module's WMS Edit/Create application page if the WMSP is associated with the WMS as a whole and on the DB22 WMS module's WMS WUG Supply Edit/Create application page if the WMSP is associated with the WMS WUG Supply level. For more information on how WMSPs are related to a WMS, see Section 5.7.3.

5.8 WUG Unmet Needs/Surpluses

To calculate WUG unmet needs/surpluses, each WUG split's total supply after WMS is calculated by deducting any recommended WMS WUG supply reductions or demand reduction transfer water volumes from its existing supply total and then adding the WUG split's recommended WMS WUG supply that it receives which includes demand reduction for each planning decade. The WUG's projected demands are then deducted from the WUG split's total supply after WMS in order to determine if all of their demands are being met through existing and recommended WMS WUG supplies. If the WUG split's projected demand in a planning decade exceeds the WUG split's total supply after WMSs are applied, the WUG split will have an unmet need in that decade represented by a negative number. If the WUG's projected demand in a planning decade is less than the WUG split's total supply after WMS, the WUG split will have a surplus in that decade represented by a positive number. When WUG split's unmet needs are summarized at the entity, region, county, basin, or state level, all calculated surpluses at the WUG split level are first updated to zero to ensure that the surpluses associated with other WUG splits do not cancel out other WUGs' unmet needs. Summarized unmet needs are represented as a positive number.

5.9 Interregional WMS and WMS Projects

More than one RWPA may use the same WMS and WMSPs. It is very important that RWPGs communicate and work together to enter the data correctly into DB22, so that WMS and WMSPs are only entered once for all regions and are not subdivided amongst them. RWPs can reference projects that are sponsored by another region even if the project does not display in their RWP DB22 reports. WUGs located in one region can still have their needs met by WMSs sponsored by other regions. TWDB WSSA staff is available to assist RWPG consultants as they plan their method of data entry.

6 Data Checks

The DB22 Data Checks module contains checks for the Sources, Entities, and WMS modules. Prior to a Region's data being certified as complete by TWDB WSSA staff, all potential errors found while running the data checks must either be addressed or have an approved appeal. Only some of the data checks can be appealed. An example of a data check that may not be appealed is when a required field is left blank. Data checks that allow for an appeal look for unusual data structures and ask that the data be reviewed and appealed if correct, such as a groundwater or surface water source with increasing total availability.

7 DB22 Data Setup and Assistance

Data entered into the 2017 version of the Regional Water Planning Application/State Water Planning Database (DB17) will be copied into DB22 where the entity data will be reworked so that it conforms to the utility based planning data structure. New WUGs will be added and some will be removed along with their water supply transaction data to create the new utility WUGs. It is very important to carefully

review all DB22 data and update as needed. If DB22 data needs to be restructured in order for it to conform to new guidance, please contact WSSA staff and they will help you find the most efficient way to make the changes in the application.

Appendix 1

Data Units of Measure

Exhibit D (2017–2021)

| Data Element | Unit of Measure |
|-------------------------------------|---|
| land area | square miles (mi ²) |
| water area | acres (ac) |
| water volume | acre-feet (ac-ft) |
| water supply and demand | acre-feet per year (ac-ft/yr) |
| treatment plant capacities | millions of gallons per day (mgd) |
| water use per capita | gallons per capita per day (gpcd) |
| stream flows and reservoir releases | cubic feet per second (cfs) |
| pumping rates | gallons per minute (gpm) or million gallons per day (mgd) |
| costs | September 2018 price indices as reported in the Engineering News Record Construction Cost Index |

Appendix 2
Methodology Used to Determine Total Availability
by Source Subtype

| Methodology Used to Determine Total Availability Volumes | Source Type/Subtype | Description of Additional Information Requested in Methodology Other Field |
|---|---|--|
| Modeled Available Groundwater (MAG) | Groundwater/MAG | |
| Groundwater Availability Model (GAM) | Groundwater/Non-MAG Groundwater/Partial MAG | Specify which model was used and the date the model was run. |
| Groundwater Availability Model (GAM) Modified | Groundwater/Non-MAG Groundwater/Partial MAG | Specify which model was used, the date the model was run, a description of the modification, and the EA approval date. |
| Effective Aquifer Recharge | Groundwater/Non-MAG Groundwater/Partial MAG | Specify basis of recharge estimates. |
| Published Data/Reports | Groundwater/Non-MAG Groundwater/Partial MAG Surface Water/Livestock Local Supply Surface Water/Other Local Supply | Name of report/dataset, who published the report/dataset, and the date the report/dataset was published. |
| Livestock/Holding Tank Volume | Surface Water/Livestock Local Supply Surface Water/Other Local Supply | |
| Permitted Amount | Groundwater/Non-MAG Groundwater/Partial MAG Reuse/Direct Reuse Reuse/Indirect Reuse | |
| Diversion Infrastructure Capacity | Surface Water/Run-of-River Surface Water/Reservoir Surface Water/Reservoir System Surface Water/Gulf of Mexico Reuse/Direct Reuse Reuse/Indirect Reuse | |
| Wastewater Treatment Plant Discharge | Reuse/Direct Reuse Reuse/Indirect Reuse | |
| Water Availability Model (WAM) Run 3 | Surface Water/Run-of-River Surface Water/Reservoir Surface Water/Reservoir System | |
| Water Availability Model (WAM) Run 3 Modified | Surface Water/Run-of-River Surface Water/Reservoir Surface Water/Reservoir System | Specify which model was used, the date the model was run, a description of the modification, the qualifier, and the EA approval date. |
| Source is not in use | All Source Types | |
| Other | All Source Types | Must provide a detailed description of the methodology used. If more than one methodology is identified, any additional information listed previously in this table must also be included. |

Appendix 3

SWP WMS Type List

| WMS Type | DB22 Data Used to Create WMS Type Value |
|----------------------------|--|
| Municipal Conservation | <i>WMS Description</i> = 'Conservation' & <i>WUG Type</i> = 'Municipal' |
| Irrigation Conservation | <i>WMS Description</i> = 'Conservation' & <i>WUG Type</i> = 'Irrigation' |
| Other Conservation | <i>WMS Description</i> = 'Conservation' & <i>WUG Type</i> = 'Livestock', 'Manufacturing', 'Mining', or 'Steam-Electric' |
| Drought Management | <i>WMS Description</i> = 'Drought Management' |
| Groundwater Wells & Other | <i>WMS Description</i> = 'Groundwater Well Development', 'Increase Groundwater Pumping using Existing Wells', 'New Infrastructure Only', 'Artificial Recharge' or 'Transfer/Transaction' & <i>Source Type</i> = 'Groundwater' |
| Groundwater Desalination | <i>WMS Description</i> = 'Desalination' & <i>Source Subtype</i> = 'Groundwater' |
| Aquifer Storage & Recovery | <i>WMS Description</i> = 'Aquifer Storage & Recovery' |
| New Major Reservoir | <i>WMS Description</i> = 'New Major Reservoir' |
| Other Surface Water | <i>WMS Description</i> = 'New Infrastructure Only', 'New Minor Reservoir', 'Out of State Source', 'Surface Water Diversion', 'Surface Water Yield Enhancement', or 'Transfer/Transaction' & <i>Source Type</i> = 'Surface Water' |
| Seawater Desalination | <i>WMS Description</i> = 'Desalination' & <i>Source Subtype</i> = 'Gulf of Mexico' |
| Direct Potable Reuse | <i>WMS Description</i> = 'Potable Reuse' & <i>Source Subtype</i> = 'Direct Reuse' |
| Indirect Reuse | <i>WMS Description</i> = 'Non-Potable Reuse', 'Potable Reuse', 'New Infrastructure Only', or 'Transfer/Transaction' & <i>Source Subtype</i> = 'Indirect Reuse' |
| Other Direct Reuse | <i>WMS Description</i> = 'Non-Potable Reuse', 'Transfer/Transaction', or 'New Infrastructure Only' & <i>Source Subtype</i> = 'Direct Reuse' |
| Conjunctive Use | <i>WMS Description</i> = 'Conjunctive Use' |
| Other Strategies | <i>WMS Description</i> = 'Brush Control', 'Rainwater Harvesting', 'Weather Modification', or 'Desalination' (when <i>Source Subtype</i> = 'Reservoir', 'Reservoir System', or 'Run-of-River') |

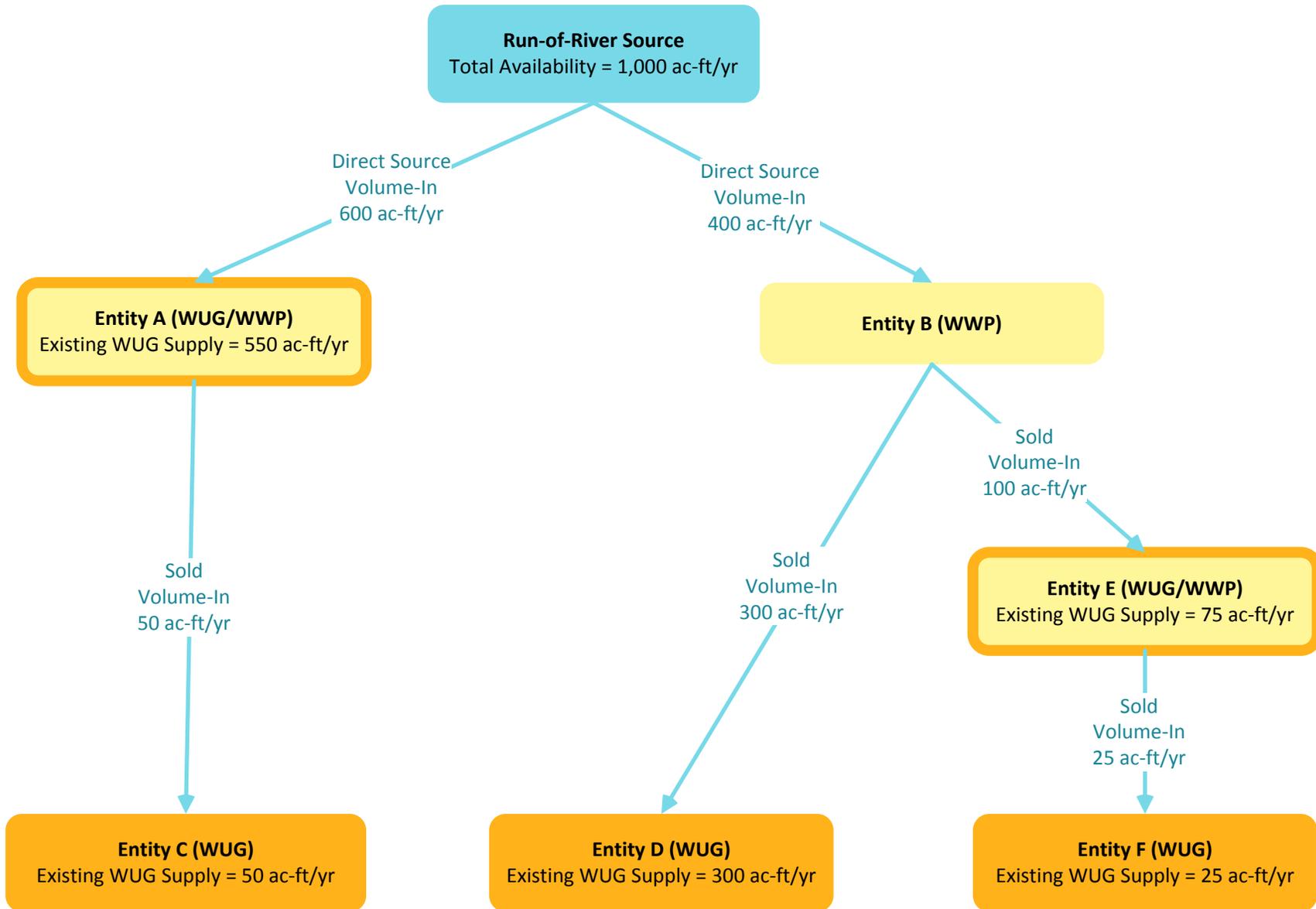
Appendix 4

List of Project Components

| List of Project Components |
|---|
| Brush Control |
| Canal Lining |
| Conservation - Agricultural |
| Conservation - Industrial |
| Conservation - Mining |
| Conservation - Municipal (does not include meter replacement or water loss) |
| Conservation - Steam Electric Power |
| Contract Amendment |
| Conveyance/Transmission Pipeline |
| Data Gathering/Monitoring Technology |
| Deepen Well |
| Diversion and Control Structure |
| Dredge to Recover Capacity |
| Emergency Temporary Transfer Agreement |
| Evaporative Pond |
| Injection Well |
| Lower Groundwater Well Pump |
| Lower Surface Water Intake |
| Multiple Wells/Well Field |
| New Agreement |
| New Contract |
| New Surface Water Intake |
| New Water Right/Permit Exempt IBT |
| New Water Right/Permit no IBT |
| New Water Right/Permit Non-Exempt IBT |
| New Water Treatment Plant |
| Pump Station |
| Rainwater Harvesting System |
| Raise Conservation Pool |
| Reservoir Construction |
| Saltwater Barrier |
| Single Well |
| Storage Tank |
| Water Loss Control |
| Water Right/Permit Amendment Exempt IBT |
| Water Right/Permit Amendment no IBT |
| Water Right/Permit Amendment Non-Exempt IBT |
| Water Right/Permit Lease or Purchase |
| Water Treatment Plant Expansion |
| Weather Modification |

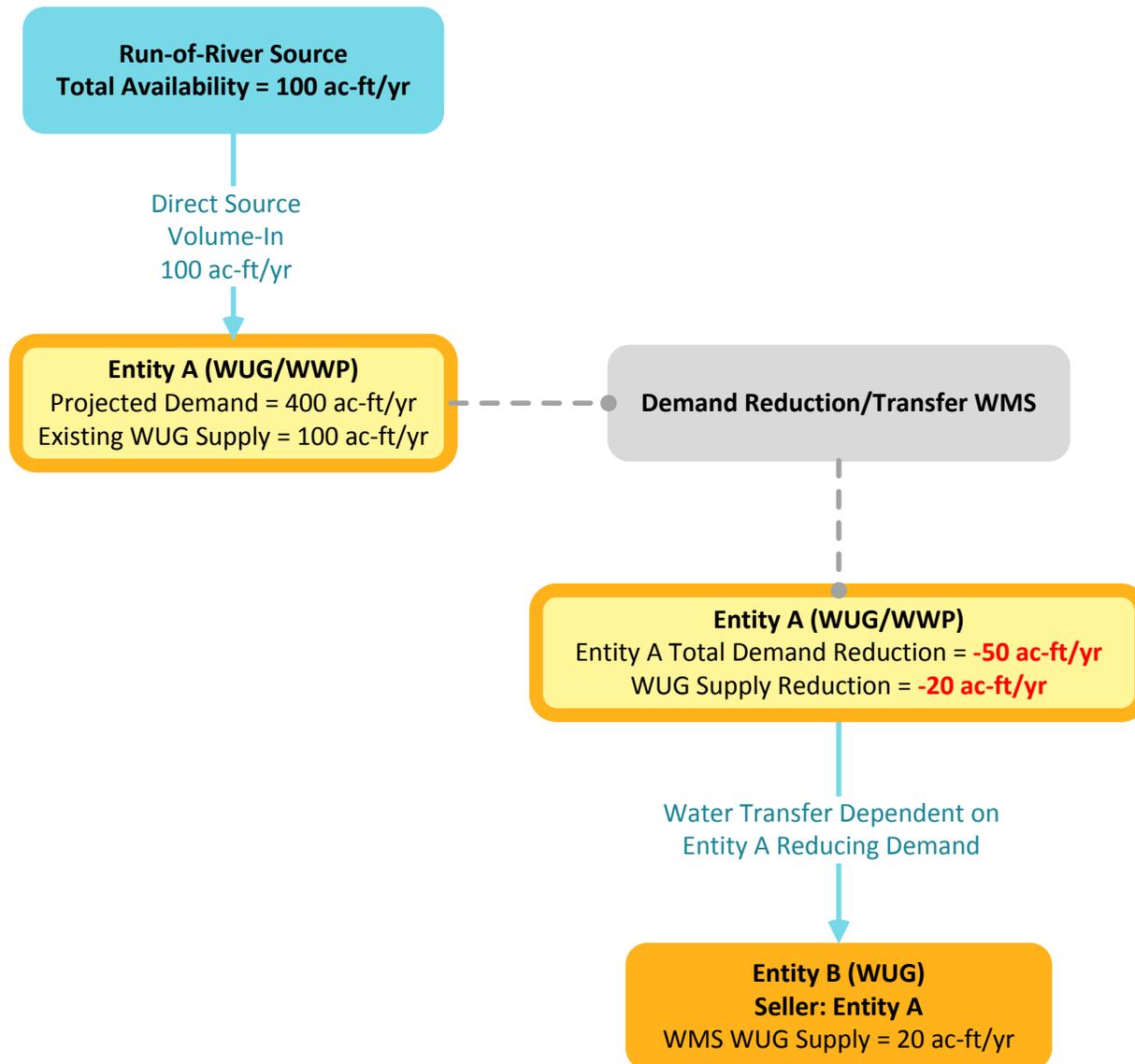
Appendix 5

Existing Sales & WUG Supply Water Transaction Example



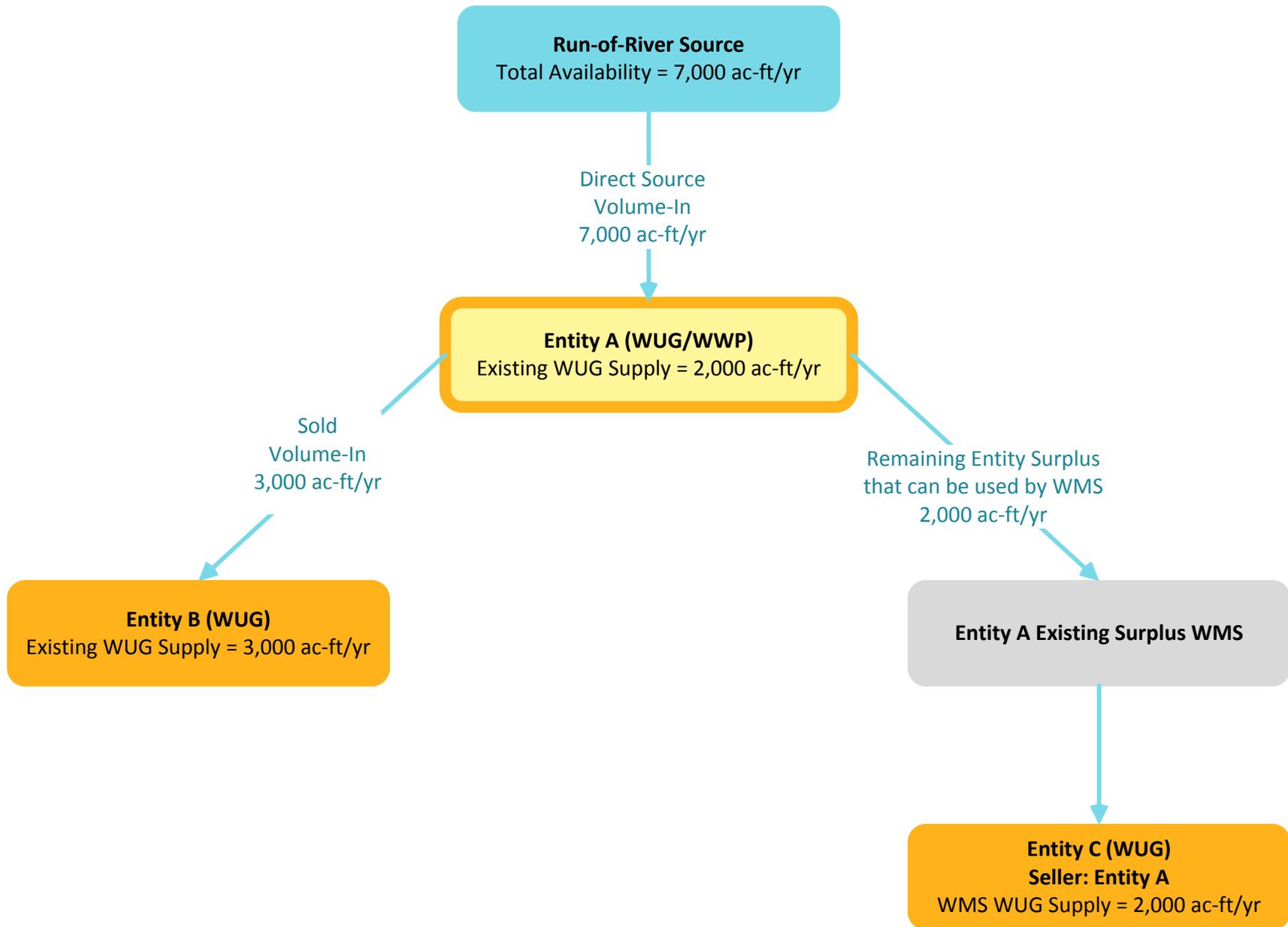
Appendix 6

Demand Reduction Transfer WMS Example



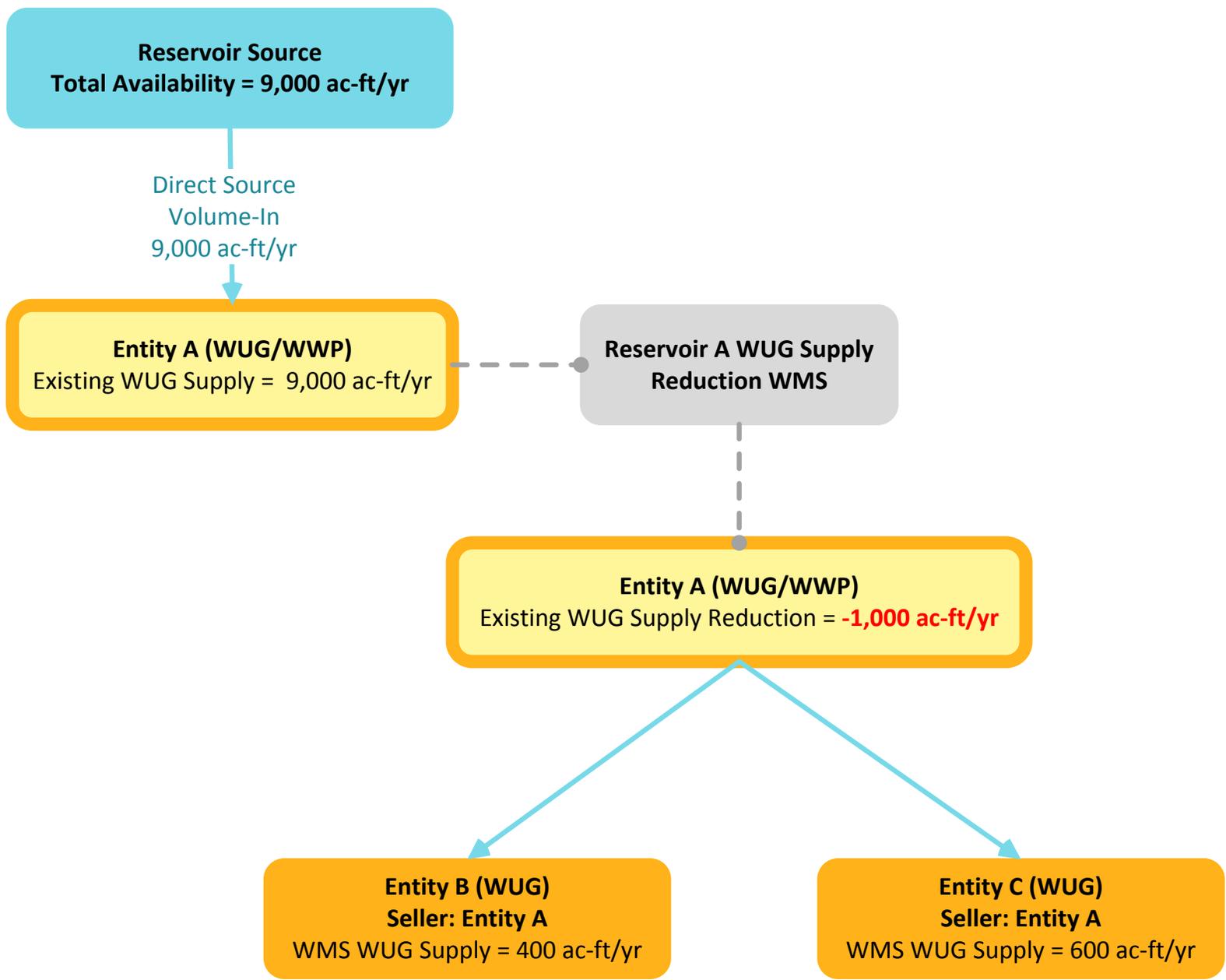
Appendix 7

Existing Surplus WMS Example



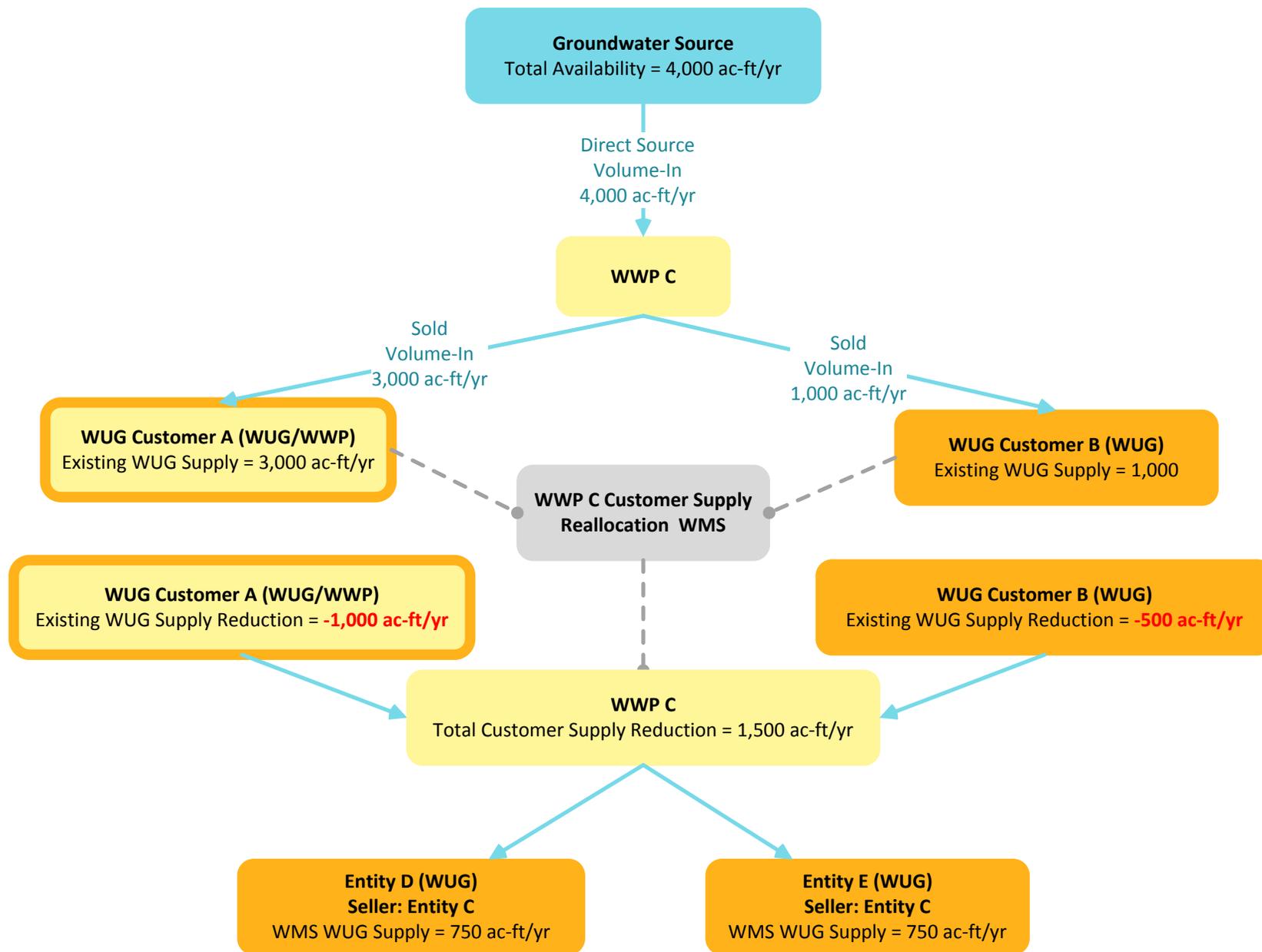
Appendix 8

WUG Supply Reduction WMS Example



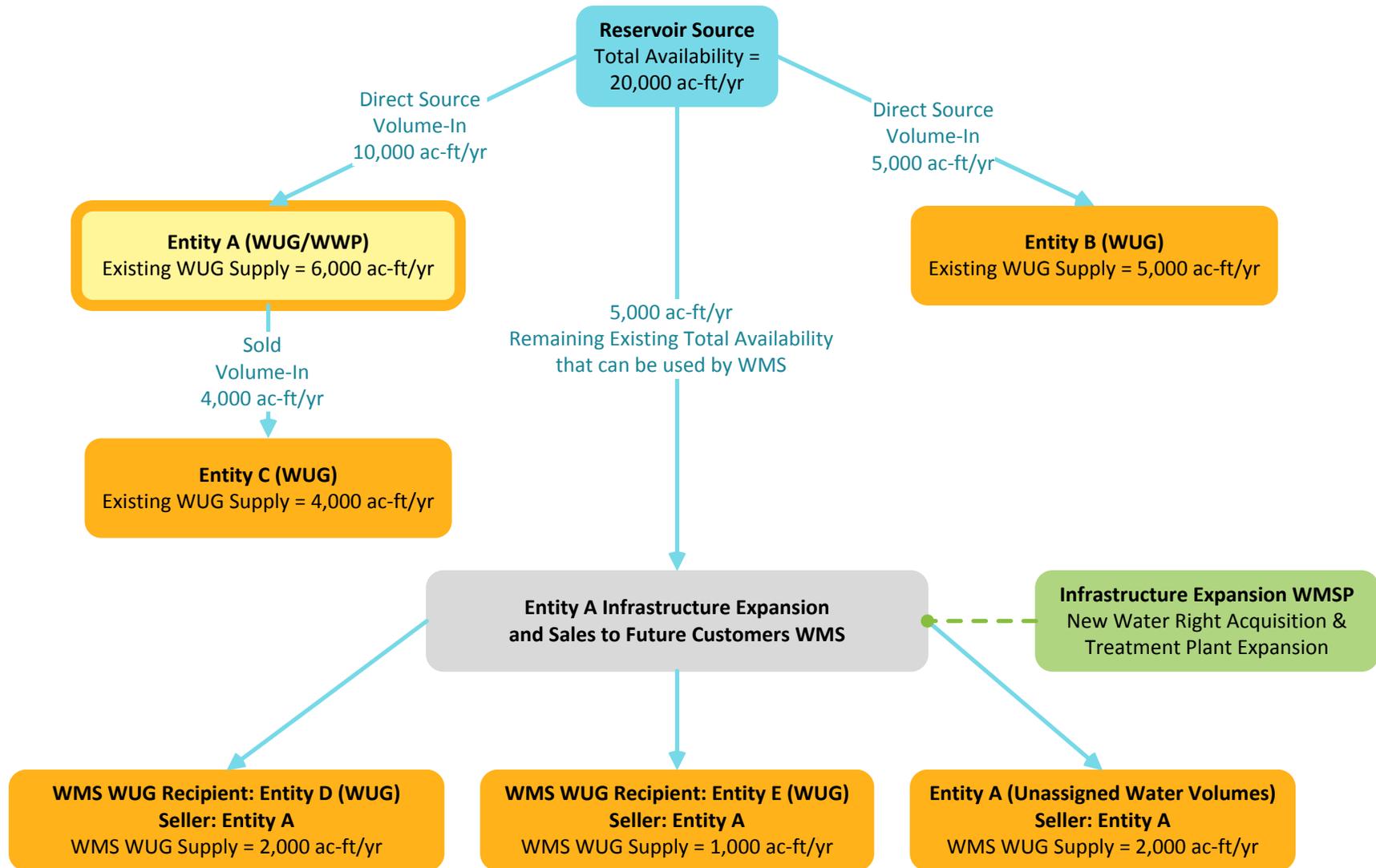
Appendix 9

WWP Customer Supply Reduction WMS Example



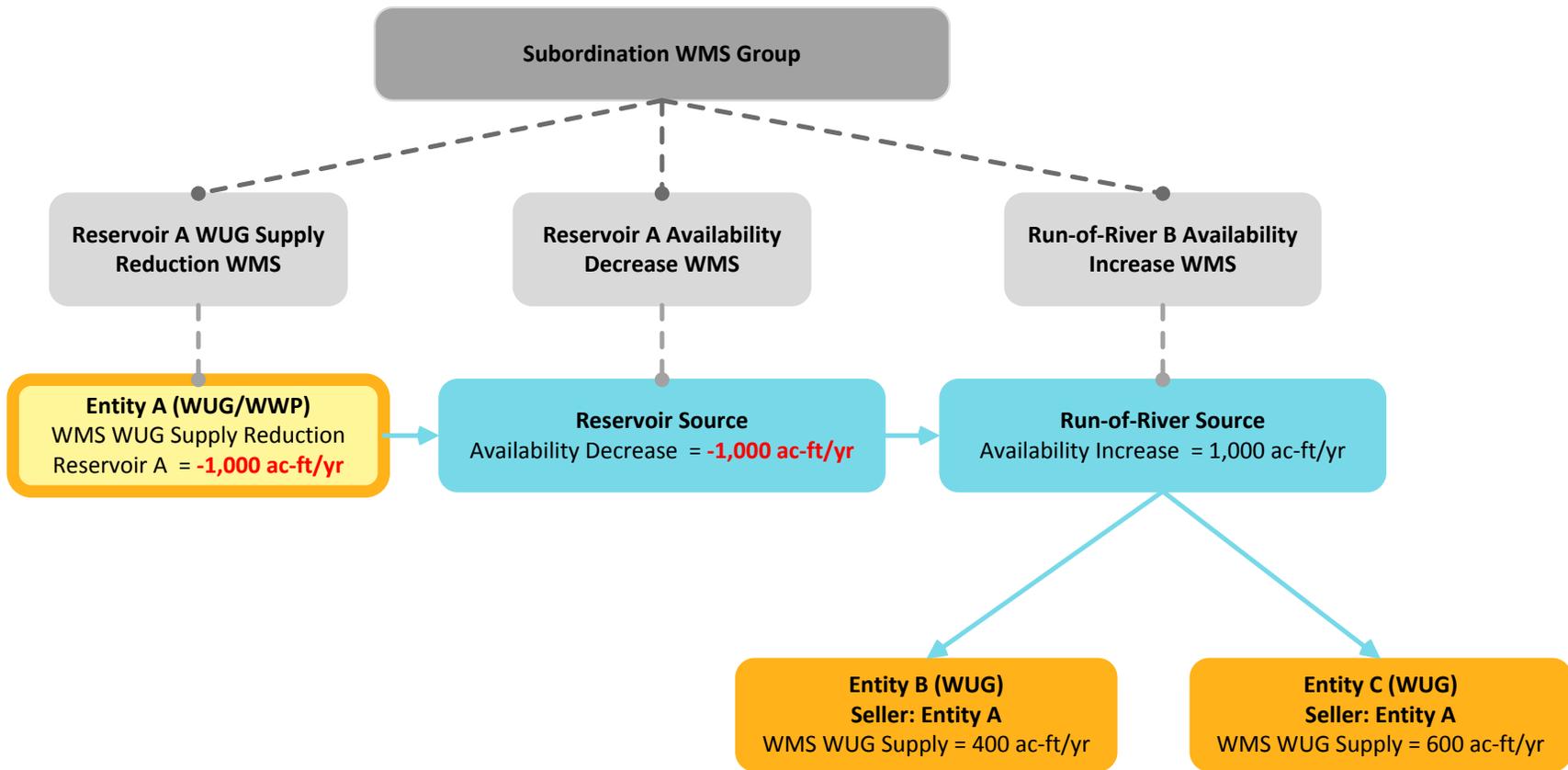
Appendix 10

Existing Availability WMS Example



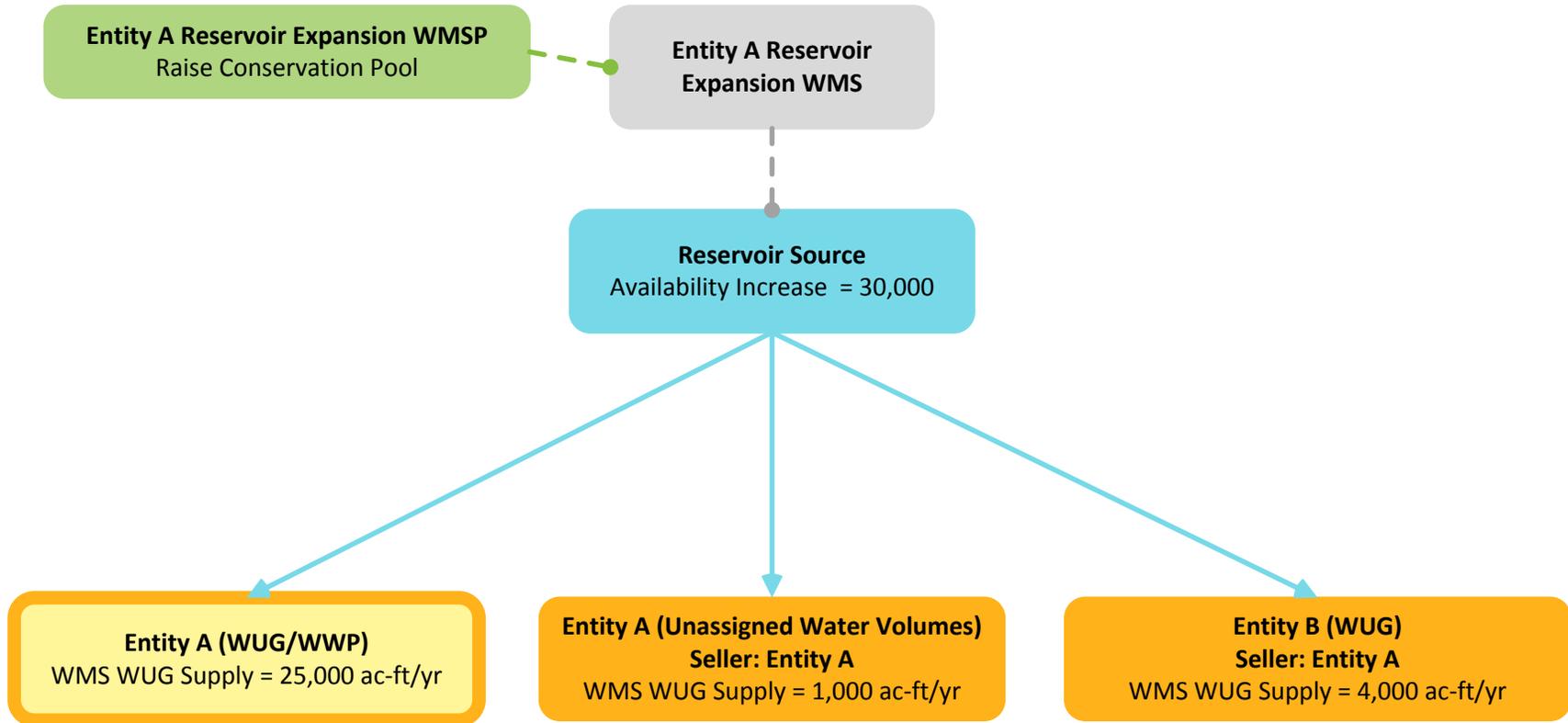
Appendix 11

Availability Decrease/Increase WMS Example



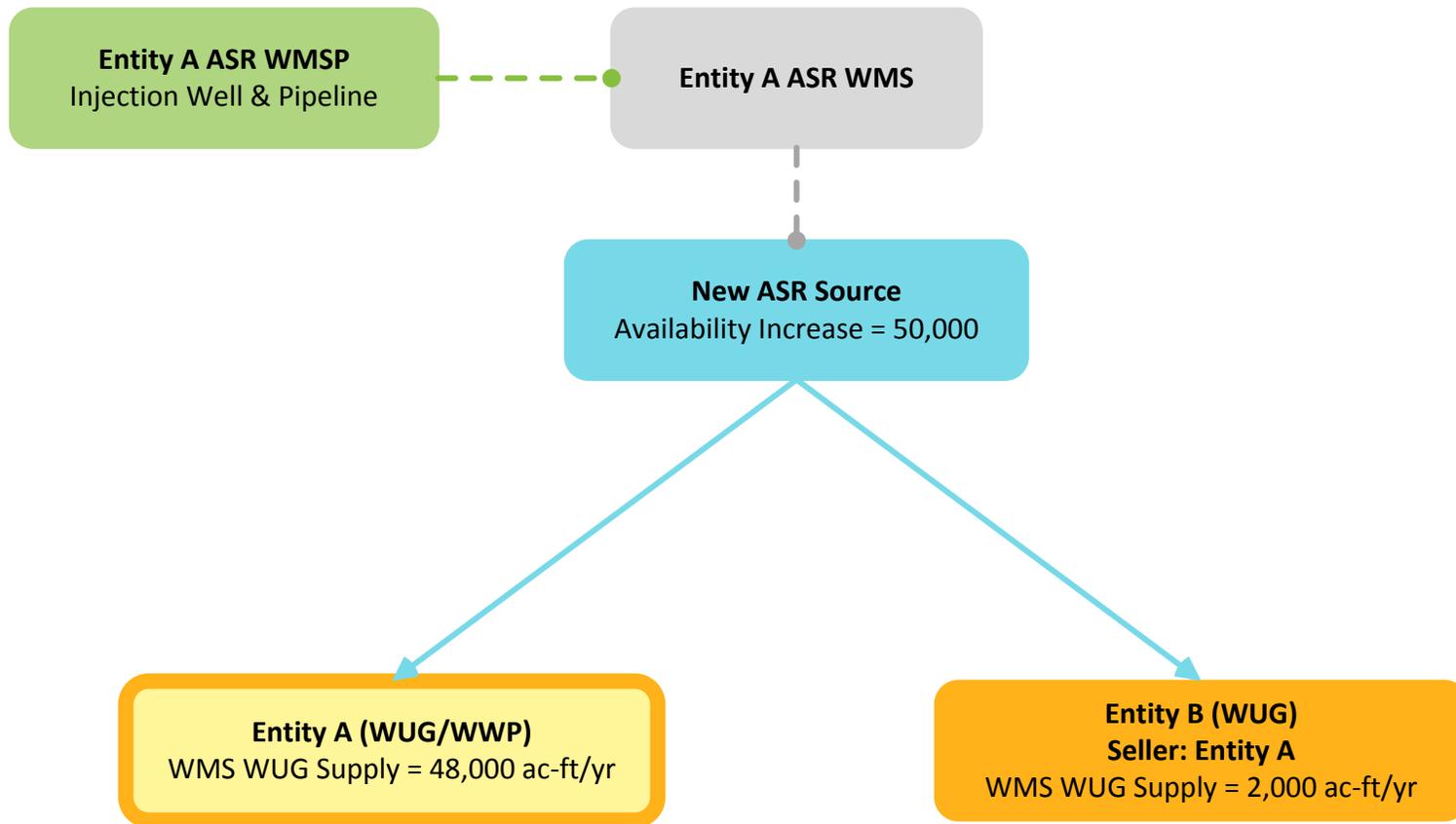
Appendix 12

Existing Source Availability Increase WMS Example



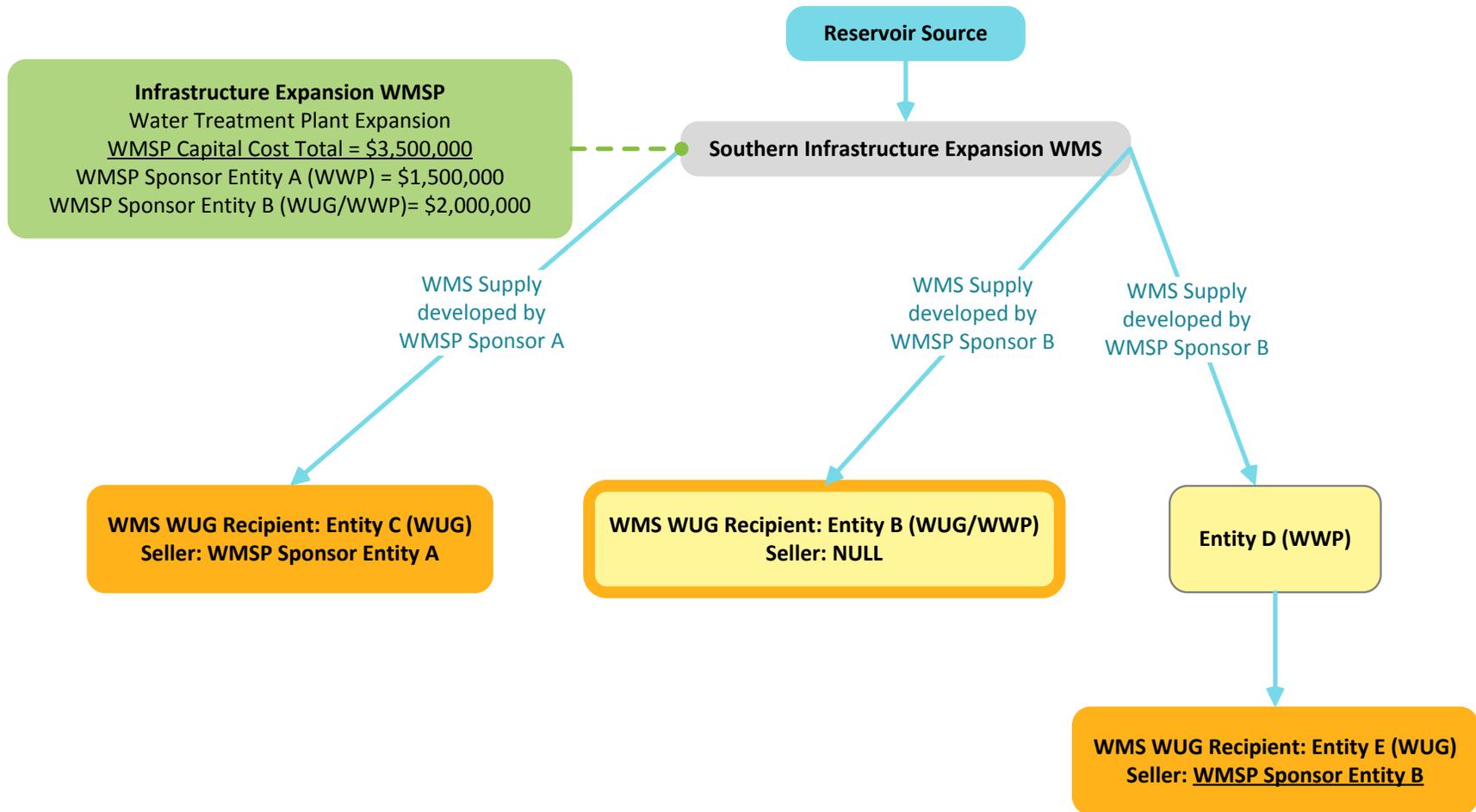
Appendix 13

New Source Availability Increase WMS Example



Appendix 14

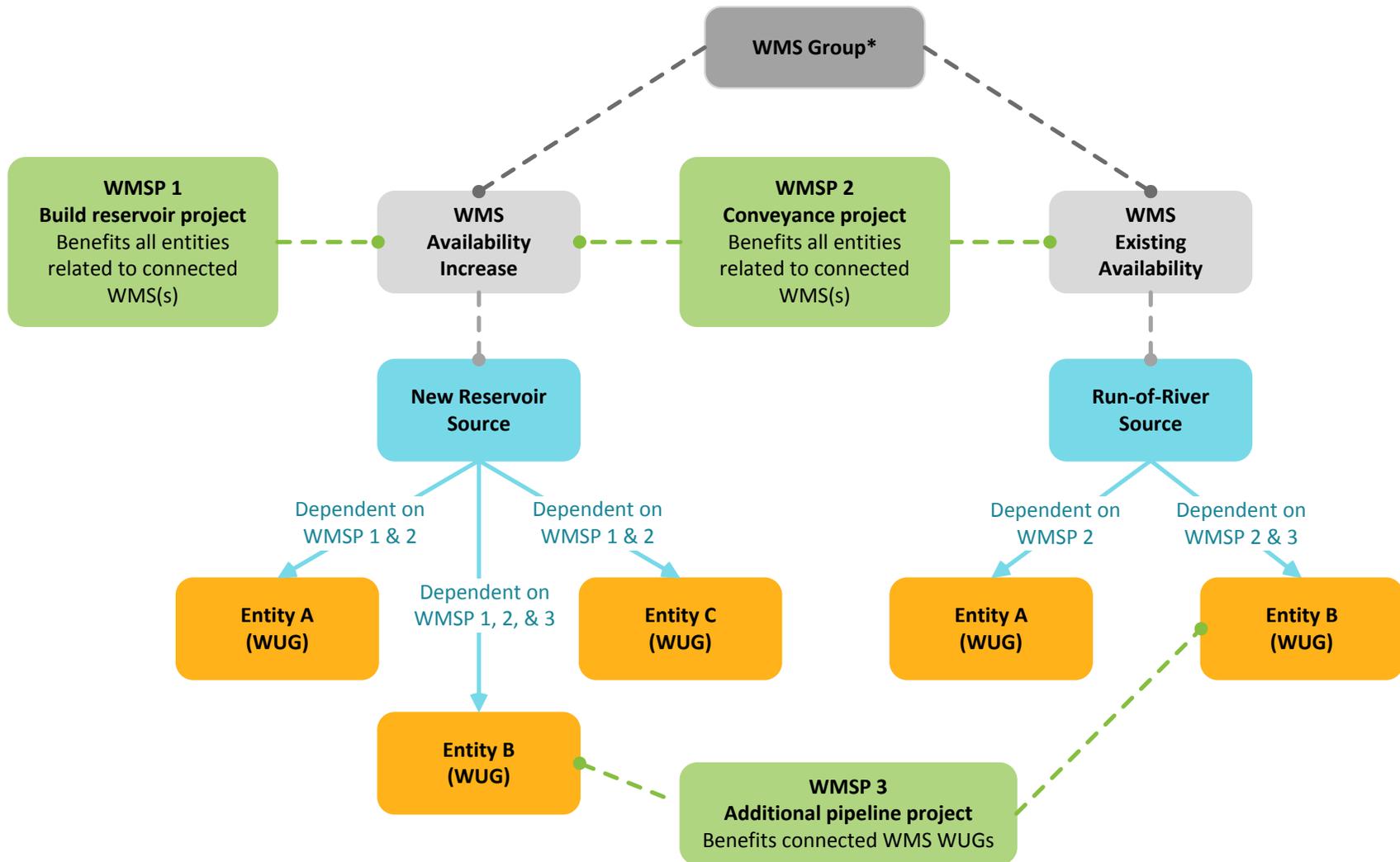
WMS Seller Relationships



*Entity D is not represented in the WMS module because it is not a WUG and does not initially develop the WMS supply.

Appendix 15

WMS Project Relationship Example



*A WMS Group will link the WMSs if they are represented as a single WMS in the RWP. If WMS are listed separately in the RWP, no WMS Group is required.