Texas Water Development Board

VERSION 1.2
March 2015

Guidelines for Regional Water Planning Data
Deliverables
(2011-2016)

Texas Water Development Board

Contents

Introduction

The Texas Legislature directed the Texas Water Development Board (TWDB) to establish standards for reports and data presented in regional water plans. Section 16.053(d) of the Texas Water Code states: "The board shall provide guidelines for the format in which information shall be presented in the Regional Water Plans." This document, along with 31 Texas Administrative Code (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 (DB17). It serves as a companion document to the *"General Guidelines for Regional Water Plan Development (2011-2016)." If there is a conflict in the guidance between the two documents, the "General Guidelines for Regional Water Plan Development (2011-2016)" takes precedence over this document.*

The remainder of this document provides more detailed guidance as to how each RWPG should report data to the TWDB. This includes general data reporting and data reporting through DB17.

The information listed in the following sections is final. Please be aware, though, that additional information may be added as the DB17 application is developed.

- Section 1 discusses general data requirements and expectations, including, but not limited to, data submitted through DB17

- Section 2 details the general format for reporting electronic data, including file and software types. This also includes, but is not limited to, data submitted through DB17

- Section 3 discusses required data for the Sources module of the DB17 application

The following sections are not final and all information in these sections is subject to change as the new DB17 application is developed. Each of these sections will be updated as the new application is developed and the application modules corresponding to these sections are released.

- Section 4 outlines required data for the Water User Group (WUG) module of DB17

- Section 5 discusses required data for the Wholesale Water Provider (WWP) module of DB17

- Section 6 outlines required data for the Water Management Strategy (WMS) module of DB17

Please be aware that database and application development of DB17 will take multiple years to complete and along the way there may be additional changes. One of the most significant changes is that WUG and WWP data will no longer be entered in separate modules in the application. All WUGs and WWPs will be grouped together in a master list of entities. Each entity will have WUG attributes, WWP attributes or both. Finally, there will be significant changes to the method which strategies, strategy sources and entities relate. For more information regarding these changes please refer to section 4.0. As a whole, these changes are intended to simplify the data entry process. This document provides an example of the extent of work that will be associated with entering data into DB17 but may change significantly as the new database and application is developed. These changes will be provided as a developing part of this contract document and released as new modules of DB17 are released for data entry.

Because of the changes to the database and application, it will be necessary for the RWPGs and their hired consultants to reestablish the relationships between entities (including WUGs and WWPs), existing sources of supply and water management strategies in DB17. This work will be similar to what was necessary in the 2007 Regional Water Planning Application (DB07).

1.0 General Data Requirements

Data should conform and comply with all 31 TAC Chapter 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 *"Guidelines for Regional Water Plan Development (2011-2016)."* Evaluations should consider surface water, groundwater and reuse data from the state water plan, existing water rights, contracts and option agreements, and any other relevant planning and water supply studies available. In addition:

- submitted information must be accurate and based on the best data and science available
- potential interregional conflicts should be identified and resolved prior to final data entry into DB17
- RWPGs must enter all fields in DB17 unless otherwise stated
- spelling, word order, and proper names must be used consistently and correctly when entering data into DB17
- 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) early on
- only whole numbers should be entered into DB17

2.0 Formats for Electronic Data

2.1 Files and Software

Electronic files may be shipped using CD, DVD or external hard drive. RWPGs should deliver one copy of electronic files (on CD, DVD or external hard drive), a copy of electronic file lists for each

CD, DVD or external hard drive, and file description print outs, including metadata file printouts. Files and data transferred to the TWDB should be in a ready-to-use format. Formats of all computer files provided to the TWDB should be compatible with widely distributed versions of the following software:

- word processor files - Microsoft Word (MS Office 2007 or newer versions)
- GIS coverages – Arc/Info (7.21 or newer)
- GIS shape files – ArcView (9.0 or newer)
- database files – Microsoft Access (MS Office 2007 or newer); each region will have access to DB17 via the internet and will be able to manage all of their data through DB17 without the need for additional database files
- internet browsers – Internet Explorer (8.0 or newer)
- spreadsheet files – Microsoft Excel (Office 2007 or newer)
- graphs, bar-charts, pie-charts – Microsoft Excel (Office 2007 or newer)

RWPGs should receive approval from the TWDB's executive administrator as to the compatibility of any alternative software.

Metadata and a printed file/disc description should accompany all electronic files. File description documentation must explain file naming conventions and contents of each disc and file. File naming conventions should follow a recognizable pattern. Files submitted must be 100 percent compatible with Microsoft Excel 2007. If using software other than Microsoft Excel 2007, RWPGs should receive prior approval from the TWDB as to its compatibility. All drawings and graphs included in reports should be provided to the TWDB in Encapsulated PostScript (EPS) formats with a TIFF preview using Pantone Process Colors (Pantone Matching System Colors – PMS colors) capable of being separated into four colors – cyan, yellow, magenta, and black.

Any other deliver methods will only be allowed with pre-approval from the TWDB if these requirements present a significant burden on the RWPG or as technology changes.

2.2 Data Units

The following units of measurement apply to all submitted data presentations:

- 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 – million 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 – constant September 2013 U.S. dollars (per Engineering News Record Construction Cost Index)

2.3 Data Requirements for Geographic Information

This section is intended to provide specific requirements and file delivery formats for all GIS materials developed in support of the regional water plan (RWP) process. These work products include GIS and imagery files that are created for the RWPGs and TWDB.

2.3.1 Required Maps and Data

While there is no list of required static maps for each RWP, RWPGs shall provide geographic information illustrating important features of each regional water planning area (RWPA) including regional boundaries, political subdivisions, major water demand centers such as cities, major providers of municipal and manufacturing water, major water supplies, mapped aquifers, and any other important and relevant features of a RWPA.

Each RWPG is responsible for submitting a digital data file containing geographic data for each recommended and alternative water management strategy (WMS) identified in the RWP.

2.3.2 Base Data

The Texas Natural Resources Information System (TNRIS) is part of the TWDB and provides GIS data state-wide. When available, RWPGs shall use TNRIS StratMap data products available online at: http://www.tnris.org/StratMap

If StratMap data products are not available, and the TWDB has other acceptable data, the TWDB shall make these base maps available. If the TWDB does not have StratMap or other products available, RWPGs may use other types of data, but shall coordinate with TWDB project managers to ensure compatibility.

2.3.3 GIS Data Files

All final versions of spatially-enabled files acquired or developed to support mapping and/or spatial analysis through TWDB-funded projects are considered property of the TWDB and are required to be submitted to TWDB. This includes but is not limited to all GIS, CAD, and image-formatted data. Only final versions of each layer are required for delivery to TWDB, and shall be in an approved format as specified in this document. In addition, all electronic geospatial data, whether vector or raster, shall have spatial reference information and be projection defined (have its coordinate system identified and embedded in or associated with the data file), and in the case of CAD data shall NOT be in page space or a custom site-specific projection. All CAD data shall be in known real world coordinate space, ideally in geographic/decimal degrees/NAD83. 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
- Horizontal Datum – the datum of the coordinates.

All static maps shown in RWPs shall be provided in an electronic Adobe PDF format with fonts embedded and at a resolution of 300 dots per inch (dpi) or greater. All ArcMap documents (.mxd) or equivalent map document formats used in final map production are also required for delivery to 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.

2.3.4 Metadata and Projection Requirements

All GIS files developed for 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 TWDB must have spatial reference information that describes the projection, datum, and where applicable the collection methods. The TWDB prefers to have vector data 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.

2.3.5 Delivery Requirements and Standard Organizational Structures

As stated in Section 2.1, RWPGs shall deliver one copy of electronic files and a copy each of electronic file lists and file description print outs including metadata file printouts. TWDB will accept data delivered on CD, DVD, or external hard drive. Other delivery methods may be allowed with pre-approval from the TWDB if those requirements present a significant burden or as technology changes.

If the project is complex, a directory structure and readme text file in the upper level directory that describes the structure is required. File description documentation must explain file naming conventions and contents of each disc and file. File naming conventions shall follow a recognizable pattern and shall include information about the Region and figure title when relevant.

 A recommended directory structure is as follows:

<ProjectName>
> *Docs* (reports, SOPs, correspondence, and other such documents)
> *Images* (aerial photos, satellite imagery, logos, DEMs, and other raster type data)
> *Maps* (MPK, MXD and PDF. Map names shall reference the Region and figure title as a prefix when possible)
> *Shapes* (geodatabases, shape files, and other approved vector data formats)
> *Source* (original unmodified data that may have been acquired from external/internal sources)
> *Tables* (databases, spreadsheets, delimited text files, or other such tabular data not stored in a geodatabase)

File naming conventions shall be logical, consistent, and contain no spaces or special characters, including the underscore. It is preferred that "camel case" be used in the formatting of file

names. "Camel case" is a formatting style that capitalizes the first letter of each word in the file name and does not include spaces. An example of "camel case" can be seen in the previous paragraph (ProjectName). File naming shall include Region and figure title when relevant.

2.3.6 TWDB Acceptable Data Formats

The following file formats are considered acceptable and all maps and data shall include an associated metadata document:

- Vector - projected to geographic, decimal degrees, NAD83 - other defined projections allowed on an individual basis:
    - Shape File (.shp, .shx, .dbf, .prj, .sbx, .sbn)
    - File Geodatabase (.gdb)
    - Personal Geodatabase (.mdb)
    - Map package (.mpk)
    - Oracle Dump (.dmp)
    - XML Workspace Document with dependencies clearly documented (.xml)
- Raster - native projection acceptable
    - TIFF image with world reference file or as a GeoTIFF (.tif, .tfw)
    - JPEG image with world reference file (.jpg, .jpw)
    - ERDAS Imagine image with pyramid file (.img, .rrd)
    - MrSid image (.sid)
    - ESRI Grid
    - DEM
- TINs - appropriate projection/coordinate system for the area depicted
    - ESRI TIN
- CAD - projected to geographic, decimal degrees, NAD83 or appropriate, specified projection
    - DXF layer separates (.dxf)
- Tabular - primary keys shall be clearly identified/documented
    - Microsoft Access 2007 database (.accdb)
    - Microsoft Excel 2007 spreadsheet (.xlsx)
    - Delimited text file (.txt, .csv)
- Static Maps
    - Adobe PDF at 300 dpi or better with embedded fonts (.PDF)
- Dynamic Maps
    - ArcMap document with associated data files in a stand-alone directory structure using relative paths (.mxd)

2.3.7 Checklists

Appendix B provides a one page checklist that can be used to verify that all geographic information meets the data requirements outlined in this section.

2.4 Graphs

Presentations of data using bar graphs, pie charts, line graphs etc. may be used where appropriate.

2.5 Data Time Frame and Time Steps

Data regarding population, water demands, water supplies, etc. are reported in decadal increments starting with the year 2020 and extending through the year 2070. Each decadal increment is a one-year representative of all years in that decade. For example, the year 2020 is a one-year snapshot of the entire decade and represents the years 2020 through 2029. Data must be developed and all requirements listed in this document and the *"Guidelines for Regional Water Plan Development (2011-2016)"* must be met for all decades even if the RWP cycle moves past the initial year.

3.0 Data for Existing Water Sources

This section describes the information in the Sources Module of DB17. It includes data fields that the RWPGs are required to populate, along with possible entry codes and methods to develop the required information. For additional guidance on the methods for regional water plan development, see the *"General Guidelines for Regional Water Plan Development (2011-2016)."*

The Sources Module in DB17 includes projected volumes of water from sources located in or available to each region under drought-of-record and existing development conditions, regardless of whether the supply is physically or legally available to use. The data within the Sources Module contains fields to describe all sources of water in the state along with their availability volumes.

The availability volumes will be entered as annual values for decades 2020 through 2070. Water sources will be described as groundwater, surface water or reuse. Sources that have the potential for desalination will also be identified in the Sources Module during the fourth cycle of regional and state water planning.

3.1 Types of Sources

Sources may be categorized under the following grouping levels in the Sources Module – surface water, groundwater, or reuse.

- Surface water: Lakes and reservoirs may be listed as individual reservoirs, as a system's surface water component (where reservoirs are operated in combination), or as the non-system portion of a reservoir. List all lakes and reservoirs as reservoirs or systems, but do not list any as run-of-river diversions. Report reservoirs and any lake/reservoir surface water components of a system at the basin level. All other surface water sources (run-of-river permits and local supplies) will be reported at the county-basin level. Surface water volumes will be reported as annual values under drought-of-record conditions.
- Groundwater: For groundwater sources, Modeled Available Groundwater estimates (MAGs) for approved desired future conditions in Groundwater Management Areas

(GMAs) will be populated in the database application by the TWDB and the values will not be editable by the RWPGs. For select aquifers in areas where MAGs do not exist, RWPGs may use other methods to determine groundwater availability, but the methods must be justified and documented. Groundwater sources may be listed as a component of a system if surface water, groundwater and/or reuse are combined together to supply end users. Groundwater volumes will be reported as annual values under drought-of-record conditions for each aquifer at the appropriate county-basin level.

- Reuse: Reuse sources should be listed as direct or indirect. Reuse sources may be listed as a component of a system if surface water, groundwater and/or reuse are combined together to supply end users. Reuse volumes will be reported as annual values under drought-of-record conditions for each reuse source at the appropriate county-basin level.

3.2 Systems

Surface water, groundwater and/or reuse sources may be aggregated and listed as systems, if applicable. It may be appropriate to list some sources as systems when 1) multiple reservoirs operate together to achieve a system gain, 2) multiple reservoirs operate together and the specific source of supply to each end user cannot be determined or 3) surface water, groundwater and/or reuse sources are combined together to supply end users.

Regardless of the justification for reporting multiple sources as a system, the firm yield of each reservoir that makes up the surface water component of the system should be listed in DB17. The only exception is when the firm yield of each reservoir that makes up the surface water component of the system has not been modeled individually. If the reservoirs that make up the surface water component of a system can be tracked to an end user, RWPGs should report these surface water sources as separate records and report any system gain as an additional source. For systems composed of surface water, groundwater and/or reuse, list both components separately. If a reservoir that is part of a system has a non-system portion, report the non-system portion as a separate record and report the system portion as part of the combined system yield (when the supply to each end user cannot be determined) or as a separate record (when the supply to each end user can be determined).

Availability volumes for systems and system components will be reported as annual values under drought-of-record conditions. The lake/reservoir surface water components of systems will be reported at the basin level, while all other surface water, groundwater and reuse components of systems will be reported at the county-basin level. The availability volume for a system may include a gain achieved via system operation.

3.3 Interregional Sources

If more than one RWPG uses individual surface water, groundwater or reuse source, or system or any component of a system, the availability volumes must be consistent among the regions sharing the source. For example, if Region X and Region Y both use an individual source, system or system component, Region X and Region Y should agree on the amount of water available

prior to data entry. The naming conventions for shared sources, systems and system components must also be listed consistently in the database application.

3.4 Overallocating Sources

RWPGs should not over-allocate water sources on a temporary or permanent basis. This means that the sum of existing water supplies plus any future WMS supplies assigned to entities (WUGs and WWPs), cannot exceed the Total Availability volume from a particular source in a county or river basin. For example, if an existing water source in a particular county or basin has an availability volume of 1,000 acre-feet per year, and 500 acre-feet per year has been apportioned to entities as their existing supply, no more than the remaining 500 acre-feet per year can be used as a source of supply for recommended WMSs.

3. 5 Data Fields for Existing Water Sources

The following is a listing of all data fields for existing water sources. All fields are editable through the application and are required unless otherwise stated below. Please refer to the matrix in Appendix C for a detailed description of field visibility and requirements.

- **SourceId** – Unique, numeric identifier for each source in the database application for the fourth round of regional water planning. This field is auto generated by the database and is not editable by the RWPGs.
- **DBSOID** – Unique, numeric identifier that was assigned to each source in the database applications for the second and third round of regional water planning. This field is assigned by TWDB staff and is not editable by the RWPGs.
- **Source Name** – Name of the water source. RWPGs and the TWDB must identify any sources not already included in the database application. The RWPGs will request to add sources to the Sources Module through the application, as necessary. The TWDB will evaluate all source requests to ensure that duplicate source records are not created within a region or between regions and that the new source record meets all database requirements. Source names will be listed consistently throughout the database application and approved by the TWDB. The source name will comply with standard database naming conventions developed by the TWDB. The source name will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, the source name will not be editable through the application.
- **Source Details** – Lists additional descriptive information about the water source. The RWPG may list additional information in this field to help uniquely identify a water source. This field will be displayed in the application to uniquely list all water sources in a region. The source details field will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, the source details field will not be editable through the application.
- **Source Region** – Identifying letter of the region (A through P) where the source is located. The source region will be editable by the RWPG when requesting a new source.

Once the TWDB has finalized the RWPG's request, the source region will not be editable through the application.

- o A = Panhandle Region
- o B = Region B
- o C = Region C
- o D = North East Texas Region
- o E = Far West Texas Region
- o F = Region F
- o G = Brazos Region
- o H = Region H
- o I = East Texas Region
- o J = Plateau Region
- o K = Lower Colorado Region
- o L = South Central Texas Region
- o M = Rio Grande Region
- o N = Coastal Bend Region
- o O= Llano Estacado Region
- o P = Lavaca Region

- **Source County** – County name where the source (or portion of the source) is located. This field is required for all sources except lakes/reservoirs, the Gulf of Mexico, the lake/reservoir surface water components of systems and sources located outside the state. For Gulf of Mexico sources, the source county will be Gulf of Mexico. For sources located outside the state, the county will be the state in which the source is located. The TWDB will provide a list of all county names. The source county will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, the source county will not be editable through the application.

- **Source Basin** – Name of the river basin where the source (or portion of the source) is located. This field is required for all sources except the Gulf of Mexico and sources located outside the state. For Gulf of Mexico sources, the source basin will be Gulf of Mexico. For sources located outside the state, the basin will be the state in which the source is located. The TWDB will provide a list of all river basin names. The source basin will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, the source basin will not be editable through the application.

- **Source Type** – Type of source. The source type will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, the source type will not be editable through the application. Please refer to the matrix in Appendix D that displays the relationships between source type and source sub type.
  - o Groundwater
  - o Surface water
  - o Reuse

- **Source Sub Type** – Additional qualifier that describes the type of source. The source sub type will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, the source sub type will not be editable through the

application. Please refer to the matrix in Appendix D that displays the relationship between source sub type and source type.

- o Groundwater
- o System
- o Reservoir
- o Run-of-river
- o Gulf of Mexico
- o Livestock Local Supply
- o Other Local Supply
- o Direct Reuse
- o Indirect Reuse

- **Is this an existing or future source?** — Indicates whether the source is an "existing source only," a "future source only," or "both an existing and future source." A source is an "existing source only" if it 1) exists currently, regardless of whether the supply is physically or legally available for use and 2) will not be used for WMSs. A source is a "future source only" if it 1) does not exist currently and 2) will only be used for WMSs. A source is "both an existing and future source" if it 1) exists currently and 2) will also be used for WMSs. The RWPG will be able to indicate if the source is an existing or future source, or both, when requesting a new source. Once the TWDB has finalized the RWPG's request, this field will not be editable by the RWPG through the application.
  - o Existing
  - o Future
  - o Both

- **Is this source generally considered brackish or saline?** – Indicates whether the source is considered fresh, brackish or saline water. The default value will be "fresh." This field will be editable by the RWPG when requesting a new source. Once the TWDB has finalized the RWPG's request, this field will not be editable through the application.
  - o Fresh (<0.5 dissolved salts in parts per thousand)
  - o Brackish (0.5–30 dissolved salts in parts per thousand)
  - o Saline (30–50 dissolved salts in parts per thousand)

- **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 will be "N."
  - o Y = Total Availability was reduced due to water quality considerations
  - o N = Total Availability was not reduced due to water quality considerations

- **Methodology used to determine Total Availability volumes** – This field identifies the methodology used to determine the Total Availability volumes. Values from the following list are only valid for certain **Source Type** and **Source Sub Type** combinations. If certain values are selected from the following list, additional information must be provided in the **Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below** field. Please refer to the matrix in Appendix E for details. For sources with a **Source Type** and **Source Sub Type** of "Groundwater" and where Total Availability

volumes are determined by Modeled Available Groundwater (MAG) numbers, the default value will be "Modeled Available Groundwater (MAG)." For all other sources, the default value will be "No methodology selected." If more than one methodology can be selected from the list, please select "Other" and enter all the methodologies and any supporting information in the **Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below** field.

- o Modeled Available Groundwater (MAG)
- o Groundwater Availability Model (GAM)
- o Groundwater Availability Model (GAM) Modified
- o Effective aquifer recharge
- o Availability set to demand
- o Published reports/data
- o Livestock/holding tank volume
- o Permitted amount
- o Diversion infrastructure capacity
- o Wastewater treatment plant discharge
- o Water Availability Model (WAM) Run 3
- o Water Availability Model (WAM) Run 3 Modified
- o Source is not in use
- o Other

- **Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below** – When certain values are selected in the **Methodology used to determine Total Availability volumes** field, additional information is required to be provided in this field. Please refer to the matrix in Appendix E for details.

- **If the source name is "Other Aquifer" please list the aquifer name. If the aquifer name is unknown, please list "Unknown"** – If the **Source Name** is "Other Aquifer," please specify the name of the aquifer in this field. If the name of the aquifer is unknown, please state that aquifer name is unknown. This field is only visible and required in the application if the **Source Name** is "Other Aquifer."

- **Is Total Availability based on firm yield?** – Indicates whether the **Total Availability (2020-2070**) fields are based on firm yield. If the values entered into the **Total Availability (2020-2070)** fields are not based on firm yield, then the firm yield of the source must be entered into the **Firm Yield (2020-2070)** fields. This field will only be visible and required in the application if the **Source Type** is "Surface Water" and the **Source Sub Type** is "Reservoir" or "System." The default value will be "Y."
  - o Y = Total Availability is based on firm yield
  - o N = Total Availability is not based on firm yield

- **Additional comments about this source** – List any additional comments that may be pertinent to this source. This is an optional field.

- **Total Availability (2020-2070)** – Values for the total, annual, amount of water available from each source for years 2020, 2030, 2040, 2050, 2060 and 2070. The Total Availability volume for each source will be reported 1) under drought-of-record and 2)

existing development conditions, even if the source is not connected and available for use.

MAG estimates for approved desired future conditions in GMAs will be populated in the database application by the TWDB and will not be editable by the RWPGs. If the MAG estimate covers the entire geographic split of the aquifer, region, county and basin (in other words, the whole source) the **Total Availability (2020-2070)** numbers will equal the **MAG Availability (2020-2070)** numbers. These fields will be populated by the TWDB and neither will be editable by the RWPG. If the MAG estimate does not cover the entire geographic split of the whole source, then the **Total Availability (2020-2070)** numbers will equal the **MAG Availability (2020-2070)** plus the **Non-MAG Availability (2020-2070)** numbers. In this case the **Total Availability (2020-2070)** and **MAG Availability (2020-2070)** numbers will not be editable by the RWPG; however, the **Non-MAG Availability (2020-2070)** will.

If a source is a lake/reservoir or the lake/reservoir surface water component of a system, the Total Availability volume will be the total firm yield or total operational supply. If the value entered is based on an operational procedure, it should not exceed the firm yield of the lake or reservoir under drought-of-record conditions, except when documented system operations yield system gains.

When a source is shared among regions, list the mutually agreed-upon Total Availability for the source. The basis for the Total Availability volume entered must be noted in the **Methodology used to determine Total Availability volumes** field. The RWPGs must have prior approval from the TWDB to list Total Availability volumes for 1) surface water sources that are not based on firm yield and 2) modified MAG estimates. In addition, if the Total Availability for a reservoir or the lake/reservoir surface water component of a system is not based on firm yield, the **Firm Yield (2020-2070)** fields must be completed.

- **Firm Yield (2020-2070)** – If **Total Availability (2020-2070)** is not based on firm yield for reservoirs and the lake/reservoir surface water components of systems; list the value for the total firm annual amounts of water available from sources for years 2020, 2030, 2040, 2050, 2060 and 2070. If a source is a lake or reservoir, the value will be the total firm yield or total operational supply. If the value entered is based on an operational procedure, it should not exceed the firm yield of the lake or reservoir under drought-of-record conditions, except when documented system operations yield system gains. This field will only be visible and editable in the application if "N" is selected from the "**Is Total Availability based on firm yield?**" field.
- **MAG Availability (2020-2070)** – The MAG estimates for approved desired future conditions in GMAs. This value will be populated for the years 2020, 2020, 2030, 2040, 2050, 2060 and 2070 by the TWDB and will not be editable by the region. If the MAG estimate covers the entire geographic split of the aquifer, region, county and basin (in other words, the whole source) these numbers will equal the **Total Availability (2020-2070)** numbers. If the MAG estimate does not cover the entire whole source, then the

Total Availability (2020-2070) numbers will equal the **MAG Availability (2020-2070)** plus the **Non-MAG Availability (2020-2070)** numbers. This field will only be visible in the application if any part of the **Total Availability (2020-2070)** field is calculated based on MAG estimates. It will never be editable in the application by the RWPG.

- **Non-MAG Availability (2020-2070)** – If the MAG estimate does not cover the entire geographic split of the aquifer, region, county and basin, then the RWPG can enter additional available supply for the geographic area not covered by the MAG. This field will only be visible and editable in the application by the RWPG under these conditions.
- **Additional comments about availability, including, if applicable, any comments about firm yield or MAG volumes** – List any additional comments specific to the availability, firm yield or MAG volumes.
- **Source Conservation Pool Details** – The following fields are listed in the **Source Conservation Pool Details** section. This section is only visible when the **Source Type** is "Surface Water" and the **Source Sub Type** is "Reservoir" or "System."
    - **System Name** – If the source is a reservoir system, then this will be the name of the source. If the source is not a reservoir system this will be "Not a Reservoir System." This field is not editable in the application.
    - **Reservoir Name** – If the source is a reservoir system, then this field will list the name of each reservoir that makes up the lake/reservoir surface water component of the system. If the source is not a reservoir system this will be the source name. This field is not editable in the application.
    - **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)?** – If the reservoir's water right is owned or controlled by a federal agency, this field should be set to "Y." If not, then the field should be set to "N." This field will be pre-populated by the TWDB.
    - **What is the original conservation pool of this reservoir or reservoir component of this system?** – Enter the reservoir's initially determined conservation pool capacity, in acre-feet, as stated in best available data in this field. This may include the reservoir's water right, hydrosurvey reports, USACE revisions, owner information, or other appropriate sources. Cite the source of the information in the **Additional comments about this reservoir or reservoir component of this system** field. This field will be pre-populated by the TWDB.
    - **Additional comments about this reservoir or reservoir component of this system** – List any additional comments related to the Source Conservation Pool Details section in this field. This includes the source of the original conservation pool information.
    - **Source System Availability: Firm Yield (2020-2070)** – Values for the total, annual, amount of water available from each reservoir component of the system for years 2020, 2030, 2040, 2050, 2060 and 2070. The availability volume for each reservoir will be reported under drought-of-record and existing development conditions, even if the reservoir is not connected and available for use. This should be the firm yield of the reservoir component of the system.

4.0 Data for Entities

The database and application development for the current round of planning is ongoing and will involve changes to the data entry system. One of the most significant changes is that WUG and WWP data will no longer be entered in separate modules in the application. All WUGs and WWPs will be grouped together in a master list of "entities" in the "entity module" of the application. The entity module focuses data entry efforts on the whole entity, unsplit by the geographic boundaries of region, county, and basin. It unites the WUG and WWP data entry sections so that information entered as purchased supply from a seller will automatically appear in that entity's purchased WUG supply section. This new structure will increase data efficiency by eliminating duplicate data entry and it will improve the quality of data by assisting the data entry user with balancing water transactions.

The entity module includes descriptive data for WUGs, WWPs and (non-WWP) Sellers during the 50-year planning horizon from 2020 to 2070. The types of data that will be reported in the entity module include population and water demand projections, existing water supply sources and their volumes, WUG supplies, water sales, entity needs and surpluses. At this time, the water management strategy module is under development; therefore entity water management strategy information for DB17 will not be included or discussed in the Guidelines for Data Deliverables version 1.1.

Moving to the entity module structure required changes to the database and application. Because of these changes, the application will not be pre-populated with the information from previous planning cycles in the Entity and Water Management Strategy modules. The RWPGs will need to reestablish the relationships between entities (including WUGs, WWPs, and Sellers), existing sources of supply and water management strategies in DB17. For information regarding the functionality of the Entity module please read the "RWP Data Entry User Guide" listed on the Help tab of the RWP Data Entry application.

4.1 Entity Types

Entities will be categorized in the following manner in the Entity module (refer to Appendix F for a diagram of entity type assignments):

4.1.1 Water User Groups

WUGs include:

- cities with a 2010 population 500 or more;
- select Census Designated Places (CDPs), such as military bases;
- utilities located outside the boundaries of the cities and CDPs listed in the first two bullets of this section, that provide more than 280 acre-feet per year of water for municipal use;
- Collective Reporting Units consisting of grouped utilities having a common water supplier or water supplies;
- rural and unincorporated areas with municipal water use (referred to as "county-other" and aggregated on a county basis);
- manufacturing (aggregated on a county basis);
- steam electric power generation (aggregated on a county basis);
- mining (aggregated on a county basis);
- irrigation (aggregated on a county basis), and
- livestock (aggregated on a county basis).

WUGs are represented at region, county and basin unit levels, and if a WUG exists in one or more regions, counties, or basins, then each geographic portion of a WUG will be listed and data will need to be reported at that level in the WUG Supply section.

 A WUG can be further divided into "Sub-WUGs" at the discretion of the RWPGs. A Sub-WUG is present when there is more than one WUG split for the same region, county, and basin. The name provided in the WUG detail field is what makes the additional WUG split unique. For example, a county-other WUG can be split into sub-WUGs to further define water users that would otherwise be aggregated at the county level. RWPGs will be responsible for maintaining all planning data at the sub-WUG level. To create a sub-WUG that doesn't already exist, please contact the TWDB.

4.1.2 Wholesale Water Providers

WWPs include:

- Any person or entity, including river authorities and irrigation districts, that has contracts to sell more than 1,000 acre-feet of water wholesale in any one year during the five years immediately preceding the adoption of the last regional water plan.

- Planning groups may include other persons and entities that are expected to meet the above definition during the period covered by the plan.

4.1.3 WUG/WWPs

WUG/WWPs include:

- An entity that meets both the WUG and the WWP definitions in the rules (see sections 4.1.1 and 4.1.2).

4.1.4 Sellers

Sellers include:

- Sellers are stand-alone entities that are not already labeled as WWP, WUG/WWP, WUG/Seller or a WUG. Sellers may have direct water sources, purchases, and sales. Sellers will function similarly to a WWP (no projection data or WUG supplies). If the Seller is technically part of a county-other WUG, the entire county-other WUG should have an entity type of "WUG/Seller". If the planning group decides to leave this type of entity aggregated in the county-other WUG and not separate it out as a stand-alone seller, then the planning group will need to list the name of the seller in the "Additional comments about this entity" field.

4.1.5 WUG/Sellers

WUG/Sellers include:

- Entities that meet the WUG definition in the rules (see section 4.1.1) and also sells less than 1000 acre-feet of water to other DB17 entities.

4.2 Entity Data Entry Requirements

Planning groups should report for each entity total water supply amounts from sources that currently exist and are connected and are accessible to entities under drought-of-record conditions, and limited to the most restrictive factor (see section 4.4.5 for a list of restrictive factors). These sources of supply may be accessed directly by an entity or purchased from another entity. Planning groups should also report WUG supply volumes and their water supply sales information. When reporting supply volumes for entities planning groups shall:

a) identify sources of existing water supply for entities;
b) enter source supply volumes (as divided by region-county-basin units) for all sources except lakes/reservoirs and surface water components of systems;
c) enter supply volumes at the basin level for reservoirs and surface water components of systems;

d) associate at least one source of supply with each entity. If the source is unreliable during drought of record conditions, show all decadal volumes as zero;

e) assign source WUG supply volumes to each WUG (or geographic portion of the WUG);
f) extend supplies into future decade based on contractual agreements if a contract is renewable or anticipated to be renewed;
g) list sales to other entities by the sources sold;

h) not exceed the total source availability volume by multiple users of a shared source;

i) ensure that an entity is not selling or using more water from a source than the amount that is actually available to them;

j) show entity surpluses in any decade when that entity plans to sell their surplus to another entity through a water management strategy.

4.3 Entity Data Entry Guidance

In order for the entity module to work as designed, entities must have correctly assigned attributes and users must follow a series of steps to enter their water supply and sales volume transactions.

4.3.1 Entity Attributes and Entity Module Display

The entity module displays data based on attributes associated with each entity. It is very important that the planning group review the entity list and confirm that the attributes have been appropriately assigned.

- Primary Region – Each entity is assigned a primary region. Data entry users with access to the entity's primary region will be responsible for all data entry associated with that entity. Data entry users with access to the entity's primary region will be able to add, edit, and delete data related to direct source water volume, WUG supply, and sales.
    - o WWPs and Sellers were assigned a primary region based on input from RWPGs.
    - o Municipal WUGs split by more than one region were assigned a primary region based on the region associated with the highest percentage of the WUG's population.
    - o Non-Municipal WUGs split by more than one region were assigned a primary region based on the region associated with the highest percentage of the WUG's demand.
- Entity Type – Each entity is assigned an entity type attribute. For a list of entity types and their descriptions see section 4.1. The assigned entity type will affect entity module page visibility. Refer to Appendix G for a table displaying entity module "page visibility" by entity type. If an entity is incorrectly labeled, please contact the TWDB for assistance.

4.3.2 Entity Transaction Data Entry Order

The entity module is designed so that purchased/sold water volumes are entered as transactional data. An entity will be associated with a volume of water that they have available to use for both their WUG demands if they are an entity type of either "WUG", "WUG/WWP", or "WUG/Seller" and sales to other entities if they are an entity type of "WWP", "Seller", "WUG/WWP", or "WUG/Seller". This volume of water is referred to as "Volume-In". The sum of the entity's WUG supply and sales to other entities cannot exceed its total Volume-In, in order for the entity's water volumes to balance. All Volume-In transactions must be listed at the source level to ensure that a source's availability is not being over-allocated. See Appendices I-K for diagrams containing water volume explanations by entity type.

Sources are associated with entities by "Tiers." A source's Tier 1 entities have direct access to the source's available volume of water, its Tier 2 entities purchase the source's water from a Tier 1 entity, and its Tier 3 entities purchase the source's water from a Tier 2 entity and so on. **It is very important that a source's entity water volume data is entered first for Tier 1 entities, then by order of the remaining Tiers.** Tier 1 entities are the first to connect with the source through the entity module page labeled Direct Source Volume-In. Once the source is connected with the Tier 1 entity on the Direct Source Volume-In page, it automatically displays as a potential source for sale and/or use as WUG supply in the other entity module pages. Once the sale of the source is established with a Tier 2 entity, it will automatically display as a potential source for sale and/or use as WUG supply for that entity. Refer to Appendix L for a diagram of the entity transaction tier structure.

Sources will display for Sales, Purchased Volume-In, or WUG Supply when these steps are followed:

1) It is advised that data entry users first identify all entities that have direct access to sources. Entities may have direct access to more than one source. Direct access means that the entity does not buy the source's water volume from another entity; (e.g., it has a water right permit or ownership of the groundwater rights.) Once the Tier 1 entity list has been identified, users should enter the total volume of water by direct access source that each Tier 1 entity has available to use for both WUG supply and/or sales to other users in the entity module's Direct Source Volume-In page. These decadal Direct Source Volume-In values can also include surpluses that the entity has direct access to and plans to sell in the future through water management strategies. See Appendices I-K for diagrams containing water volume explanations by entity type.

2) If the Tier 1 entity has the attribute of WWP, Seller, WUG/WWP, or WUG/Seller, the user will next enter all sales data related to that entity. The selling entity will establish relationships with buyers through the entity module's Entity Sales page. Once the buyer/seller relationship has been established, all sources that the seller has associated with it will be displayed for each of the buyers. If a source is not being sold, the data entry user must uncheck the **Sold** box next to the source name. Water volumes sold to a buyer become their "Purchased Volume-In" and will automatically display as a potential source for sale and/or use as WUG supply in their entity module pages.
   Note: Transaction types must be tracked separately in order for the water volumes to balance. A transaction type can be "Direct Source" or "Purchased." For example, if an entity has both direct sources and purchased sources, they will need to account for both their Direct Source and Purchased data related to that source in the sales and WUG supply sections.

3) All subsequent entity tier purchase data should be entered in order of tier so that transaction types/sources will display for use by WUG supply or sales.

4) Once a) all the Direct Source Volume-In values have been entered for sources, b) the buyer/seller relationships have been established and c) water volumes are allocated to the sources sold; direct source and purchased Volume-In values will display for entities with a type of WUG, WUG/WWP, or WUG/Seller on their Entity WUG Supply pages. The data entry user will establish how much volume from each transaction type/source is being used as WUG supply for the entity as a whole (unsplit by geographic boundaries). Once the whole entity WUG supply volume has been entered, the data entry user can click the **Split Use** button and allocate the whole entity's WUG supply by transaction type/source to its WUG splits based on their percentage of the whole entity's WUG demand in each decade. If a source automatically displays in the WUG supply page for one of its geographic splits and it is not associated with its supply, uncheck the **WUG Uses** check box.

4.3.3 Wholesale and Retail Sales

There are two types of sale, "Wholesale" and "Retail". An entity sells water wholesale when they sell directly to another entity. A retail sale takes place when the water is sold not to the entity as a whole, but to individual customer connections that are counted as part of the entity's population. See Appendix H for a diagram displaying the difference between wholesale and retail sales. The data entry rules associated with the wholesale/retail sales are as follows:

- An entity cannot sell the same source volume wholesale to an entity that either directly sold the source volume to them or indirectly sold it to them. If an entity buys water from another entity either directly or indirectly and they plan to sell it back, the water volume should not be listed as a sale and should remain with the entity that will ultimately be using it to meet their internal demands or keeping the water as a surplus for future sales. This may require modifying volumes to avoid "feedback loops".
- An entity cannot sell retail to another entity that has a type of "WWP" or "Seller". Only entity types of "WUG/WWP", "WUG/Seller", and "WUG" can purchase retail.
- Retail water sold to an entity cannot be resold to another entity. Retail water goes directly to end user connections and therefore cannot be resold.

4.3.4 Adding or Removing Transaction Chain Data

When source water volumes are bought and sold through multiple sellers, this builds a "transaction chain". If a seller is associated with multiple sources through either direct access or through purchases, all of their sources are displayed for customers related with the seller. When a new source is added to the seller, it is also added to its direct and indirect customers as both a purchased volume and WUG supply records. **In order to remove a source from a seller, the records related to that seller/source combination must first be removed from all customers that have purchased from that seller or another seller that purchased water from the seller.** This functionality will assist users with keeping all sources and sales in balance.

4.3.5 Balancing Entity Water Volume Data

In order for the entity's water volume data to be correct, certain conditions must be true:

- For each transaction type / supply source combination, the sum of the split WUG supply volumes must equal the whole entity WUG supply volumes for each decade.

- For each transaction type / supply source combination, the sum of the whole entity WUG supply volumes plus the total sales to other customers must be equal to or less than the associated Volume-In for each decade.

- For each buyer/seller combination, the total amount sold to an entity must be equal to the sum of the sale allocated to the seller's sources for each decade.

- The sum of all Direct Source Volume-In water volumes associated with a source must be equal to or less than the source's total availability volume or else the source will be considered over-allocated.

The application incorporates unintrusive calculated fields that assist the user with balancing underlying water volumes. When an update to the entity module pages creates an issue with a decade, all data entry boxes related to the decade's water volume will be highlighted in red, yet allow the user to save data. See section 4.4 Entity Data Fields for a detailed description of how the calculated fields work. There will also be an Entity Data Checks module that will provide the user with a master list of all potential errors.

4.4 Data Fields for Entities Existing Water Supply

 Please read the "RWP Data Entry User Guide" listed on the **Help** tab of the RWP Data Entry application for more information on each Entity Module page's functionality.

4.4.1   Entity Description

- "EntityRWPId"- Unique, numeric identifier that is assigned to each whole entity and their associated splits in the database applications for the fourth round of regional water planning. This field is assigned by TWDB staff. Not editable.

- "Entity Name"- Name of entity. Entities should only be listed only once in this module. Not editable.

- "Entity Region"- Identifying letter for region (A through P) for the entity. This is the "primary region" for the entity and the planning group listed will be the planning group responsible for all of the data entry for that entity. Refer to section 4.3.1 for a description of the entity primary region. Not editable.

- "Entity Type"- Type of Entity: WUG, WWP, WUG/WWP, WUG/Seller, Seller. Not editable.

- "Entity WUG Type" – Category of water use: Municipal, Manufacturing, Steam Electric Power, Irrigation or Livestock concatenated with the WUG sub category: City, County-Other, Utility, Collective Reporting Unit, Manufacturing, Mining, Irrigation, Livestock, or Steam Electric Power. Not editable.

- "Additional comments about this entity"- Lists additional descriptive information about the entity. Editable.

4.4.2 WUG Projections

The TWDB will upload all population data after the regional review process for population and water demands is complete and Board has approved population estimates.

Whole Entity WUG Projections Totals

- "Population"- Sum of the annual WUG population values for 2020 through 2070 for the entity as a whole. Population data is associated with municipal WUGs only. Not editable.

- "Water Efficiency Savings"- Estimated water use reduction in GPCD for each municipal WUG as a whole due to replacement rates for adoption of water-efficient fixtures and appliances required by law for decades 2020 through 2070. Not editable.

- "GPCD"- WUG gallons per capita daily volumes for decades 2020 through 2070, for each municipal WUG as a whole. Not editable.

- "Demand"- Sum of the annual WUG demand values in acre-feet for each WUG as a whole for decades 2020 through 2070. Calculated projected demands include water efficiency savings. Not editable.

Split Entity WUG Projections

- "Population"- WUG population values for decades 2020 through 2070 for each geographical portion of a municipal WUG. Population data is only entered for municipal WUGs. Not editable.

- "Water Efficiency Savings"- Estimated water use reduction in GPCD for each geographical portion of municipal WUG due to replacement rates for adoption of water-efficient fixtures and appliances required by law for decades 2020 through 2070. Not editable.

- "GPCD"- WUG gallons per capita daily values for decades 2020 through 2070 for each geographical portion of a municipal WUG. Not editable.

- "Demand"- Annual WUG water demand values in acre-feet for each geographical portion of a WUG for decades 2020 through 2070. Not editable.

4.4.3   Direct Source Volume-In

- "Summary Report" – By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the entity name listed in the grey title bar.

- "Entity Name | Primary Region" - Name of entity and the entity's primary region. Not editable.

- "Source Name | Detail" – To add a source, click the **Add Source** button listed to the left of the Entity Name. For more information on how to add a source, refer to the document titled "RWP Data Entry User Guide." Name of the water source concatenated with the value listed in the Source Detail field. Not editable.

- "Region" - Identifying letter of the region (A through P) where the source is located. For more information regarding this field, refer to section 3.5. Not editable.

- "County" - County name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Basin" - Basin name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Salinity" - Indicates whether the source is considered fresh, brackish or saline water. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Type | SubType" – The type of source concatenated with the Source Sub Type. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Balance Report" - By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the source.

- "Unused Source Availability 2020-2070" – The sum of all entities' Direct Source Volume-In related to each source subtracted from the source's Total Availability volumes. This calculation will display the amount remaining of the source's Total Availability that can be used as Direct Source Volume-In. Once an entity exceeds the source's Total Availability volume in any decade, the over-allocated decade will highlight in red for all entities associated with the source as a Tier 1 entity. To refresh the calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Direct Source Volume-In 2020-2070" – Annual Direct Source Volume-In for entity as a whole by source for decades 2020 through 2070. Direct Source Volume-In total should include WUG supply to Entity's geographic splits, sales to other entities, and any surpluses held. In order for the supply volume to be considered "Direct Source Volume-In," the user must have direct access to the source's water volume. If entity purchases the water volume, it will be listed on the Entity Sales page and not the Entity Direct Source Volume-In page. Increases requiring new infrastructure should be attributed to recommended water management strategies. Editable.

- "External Comments" – Lists additional descriptive information about the entity's Direct Source Volume-In from a source. Editable.

- "TransactionId" – Unique, numeric identifier that is assigned to each direct source Volume-In record stored in the database. This field is assigned by TWDB staff. Not editable.

4.4.4 Entity Sales

- "Buyer Entity Name"- The name of the entity purchasing water from the seller. To add a buyer to a seller click either the **Wholesale** or **Retail** button listed to the left of the Entity Name. Refer to section 4.3.3 for a detailed description of Wholesale and Retail. For more information on how to add a buyer to a seller refer to the document titled "RWP Data Entry User Guide." Not editable.

- "Wholesale/Retail"- Data saved in this field is added when a seller chooses to either sale wholesale or retail when selecting a buyer. See section 4.3.3 which describes wholesale and retail sales. Editable.

- "Buyer Entity Summary Report"- By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the buyer entity.

- "Buyer WUG Demand"- The whole WUG demand of each buyer entity for decades 2020 through 2070. This row will be null for buyer entities with a type of "WWP" or "Seller". Not editable.

- "Contract Demand"- Volume of water required by contract for each buyer entity for decades 2020 through 2070. Editable.

- "Contract Expiration Date"- Contract expiration date for each buyer's purchase. Planning groups should include this date even if a contract is assumed to be renewable. If the contract does not expire, enter the value 12/31/9999. Editable.

- "External Comments"- Lists additional descriptive information about the entity's sale to the purchaser. Editable.

- "TransactionId" – Unique, numeric identifier that is assigned to each contract demand record stored in the database. This field is assigned by TWDB staff. Not editable.

- "Total Sale Amount"- Total volume sold to each buyer entity for decades 2020 through 2070. Editable.

- "TransactionId" – Unique, numeric identifier that is assigned to each total sale record stored in the database. This field is assigned by TWDB staff. Not editable.

- "Allocated Total Sale Amount"- The sum of all volumes sold to a buyer entity that has been allocated to each source sold. The sum of the Allocated Total Sale Amount must equal the corresponding Total Sale Amount decade. If a Total Sale Amount decade does not equal the corresponding Allocated Total Sale amount decade, the Total Sale Amount decade and the decade of the all allocated sources will highlight in red. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Sold"- All sources associated with a seller are automatically displayed for each buyer that is added. If a source is not being sold to a buyer, the data entry user must uncheck the **Sold** checkbox next to the source. Editable.

- "Transaction Type"- This field describes how the source is acquired by the seller. The transaction type can be "Direct Access" or "Purchased." Not editable.

- "Direct Source Entity Name"- If the transaction type is "Purchased," the transaction chain's direct access user will be listed. It is the name of the entity that added the source as direct source volume-in and set up the initial sale of the source to either the buyer entity displayed or another entity that either directly or indirectly sold to the buyer. If the transaction type is "Direct Access," the seller's entity name will be listed. Not editable.

- "Source Name | Detail"- Concatenated source name and source detail fields. For more information regarding this field, refer to section 3.5. Not editable.

- "Region" - Identifying letter of the region (A through P) where the source is located. For more information regarding this field, refer to section 3.5. Not editable.

- "County" - County name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Basin" - Basin name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Salinity" - Indicates whether the source is considered fresh, brackish or saline water. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Type | Subtype" – The type of source concatenated with the Source Sub Type. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Balance Report" - By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the source.

- "Total Volume Available for Sale"- The sum of all sales associated with the source/ transaction and the seller entity's WUGs supplies, if any; subtracted from the source transaction's associated Volume-In values. This calculated row identifies how much water is left available for sale for the source/transaction combination. If the user attempts to sell more water than is available in any decade, that decade will highlight in red. To refresh the calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Sale Amount"- The volume of water for decades 2020-2070 that has been sold from the source/transaction listed. Editable.

- "External Comments"- Lists additional descriptive information about the entity's sales by source/transaction for the buyer entity. Editable.

- "TransactionId" – Unique, numeric identifier that is assigned to each sold source record stored in the database. This field is assigned by TWDB staff. Not editable.

4.4.5   WUG Supply

Direct Source Entity WUG Supply

- "Entity Name"- Name of entity and the entity's primary region. Not editable.

- "Entity Summary Report"- By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the entity.

- "Transaction Type"- This field describes how the source was acquired by the seller. In this case the transaction type will be "Direct Access." Not editable.

- "Entity Name"- Name of entity and the entity's primary region. Not editable.

- "Source Name | Detail"- Concatenated source name and source detail fields. For more information regarding this field, refer to section 3.5. Not editable.

- "Region" - Identifying letter of the region (A through P) where the source is located. For more information regarding this field, refer to section 3.5. Not editable.

- "County" - County name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Basin" - Basin name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Salinity" - Indicates whether the source is considered fresh, brackish or saline water. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Type | Subtype" – The type of source concatenated with the Source Sub Type. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Balance Report" - By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the source.

- "Remaining Direct Source Volume-In"- Sum or all WUG Supplies and sales, if any; subtracted from the entity's Direct Source Volume-In associated with the source for decades 2020-2070. This calculated row identifies how much water is left available for use as WUG Supplies. If the user enters a greater WUG supply volume than what is available in any decade, that decade will highlight in red. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Direct Source Whole WUG Supply"- Annual supply volume from each direct source used to meet each whole entity's internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.
- "Limiting Factor"- Listing of limiting factor letter found to be most restrictive for each direct source of supply for each WUG. Editable. Water supplies for WUGs should be limited to the most restrictive from the following criteria:

    o A) Supplies or fractions of supplies available from reservoirs or surface water components of systems.
    o B) Current well field capacities.
    o C) Hydrogeologic properties of aquifers.
    o D) Water quality.
    o E) Current water rights, permits or other applicable regulatory restrictions.
    o F) Current contracts and/or option agreements.
    o G) Existing conveyance infrastructure.
    o H) Water treatment plant capacity.
    o I) Obligations that water user groups may have in terms of contracts or direct and indirect water sales to other entities.
    o J) 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 "External Comments" field.

- "External Comments"- Lists additional descriptive information about whole WUG entity's direct access WUG supplies for each source listed. Editable.

- "TransactionId" – Unique, numeric identifier that is assigned to each direct source whole WUG supply record stored in the database. This field is assigned by TWDB staff. Not editable.

- "Split WUG Total"- The sum of the WUG's geographic split volumes by direct access source for decades 2020-2070. The Split WUG total for the whole entity's geographic splits must equal the whole entity's WUG supplies for each direct access source. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Uses"- All direct access sources associated with an entity are automatically displayed in the entity's WUG supply section. If a source is not being used as WUG supplies, the data entry user must uncheck the Uses checkbox next to the source. Editable.

- "Split WUG Supply"- Annual direct source supply volume used to meet each WUG's geographic split(s) internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.

- "External Comments"- Lists additional descriptive information about WUG geographic split's direct access WUG supplies for each source listed. Editable.

- "TransactionId" – Unique, numeric identifier that is assigned to each direct source split WUG supply record stored in the database. This field is assigned by TWDB staff. Not editable.

Purchased Entity WUG Supply

- "Seller – Entity Name | Detail"- Name of the seller entity and that entity's primary region associated with the Purchased Volume-In and WUG Supplies. Not editable.

- "Wholesale/Retail"- Data saved in this field is added when a seller chooses to either sale wholesale or retail when selecting a purchaser. See section 4.3.3 which describes wholesale and retail sales. Not editable for buyer entity. If buyer data needs to be updated, contact the data entry user responsible for entering the seller's data.

- "Seller Entity Summary Report"- By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the seller entity.

- "Buyer Contract Demand"- Annual volume amounts required by contract for each supply purchased from another entity for decades 2020 through 2070. Supplies based on contractual agreements must extend past the existing term of a contract if contract holders expect renewals or extensions. Increases requiring new infrastructure should be attributed to recommended water management strategies. Not editable for buyer entity. If buyer data needs to be updated, contact the data entry user responsible for entering the seller's data.

- "Contract Expiration"- Contract expiration date for each buyer's purchase. Not editable for buyer entity.

- "TransactionId" – Unique, numeric identifier that is assigned to each entity contract demand record stored in the database. This field is assigned by TWDB staff. Not editable.

- "Total Remaining Purchased Volume-In by Seller"- Sum or all WUG Supplies and sales, if any; subtracted from the entity's Purchased Volume-In associated with the seller for decades 2020-2070. This calculated row identifies how much water is left available for use as WUG Supplies. If the user attempts to enter a greater WUG supply volume than what is available in any decade, that decade will be highlighted red. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Total Purchased WUG Supply"- The sum of all WUG Supplies allocated to purchased sources used to meet whole entity's internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. If the total purchased WUG supply does not equal the supply allocated to the purchased sources in any decade, that decade will be highlighted red. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Transaction Type"- This field describes how the source was acquired by the seller. The transaction type can be "Direct Access" or "Purchased." Not editable.

- "Direct Source Entity Name"- Source's transaction chain's direct access user. It is the name of the entity that added the source as direct source volume-in and set up the initial sale of the source to either the buyer entity displayed or another entity that either directly or indirectly sold to the buyer. Not editable.

- "Source Name | Detail"- Concatenated source name and source detail fields. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Name | Detail"- Concatenated source name and source detail fields. For more information regarding this field, refer to section 3.5. Not editable.

- "Region" - Identifying letter of the region (A through P) where the source is located. For more information regarding this field, refer to section 3.5. Not editable.

- "County" - County name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Basin" - Basin name where the source (or portion of the source) is located. For more information regarding this field, refer to section 3.5. Not editable.

- "Salinity" - Indicates whether the source is considered fresh, brackish or saline water. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Type | SubType" – The type of source concatenated with the Source Sub Type. For more information regarding this field, refer to section 3.5. Not editable.

- "Source Balance Report" - By clicking on the "View Report" hyperlink, the user will load a PDF containing a summary of all data related to the source.

- "Remaining Purchased Volume-In by Seller/Source"- Sum or all WUG Supplies and sales, if any; subtracted from the entity's Purchased Volume-In associated with the seller, source and transaction for decades 2020-2070. This calculated row identifies how much water is left available for use as WUG Supplies. If the user attempts to enter a greater WUG supply volume than what available in any decade, that decade will be highlighted red. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Purchased Whole WUG Supply"- Annual supply volume from each purchase by seller, source, and transaction used to meet each whole entity's internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.

- "Limiting Factor"- Listing of limiting factor letter found to be most restrictive for each purchased WUG supply for each WUG. Editable. Water supplies for WUGs should be limited to the most restrictive from the following criteria:

  - A) Supplies or fractions of supplies available from reservoirs or surface water components of systems.
  - B) Current well field capacities.
  - C) Hydrogeologic properties of aquifers.

- o D) Water quality.
- o E) Current water rights, permits or other applicable regulatory restrictions.
- o F) Current contracts and/or option agreements.
- o G) Existing conveyance infrastructure.
- o H) Water treatment plant capacity.
- o I) Obligations that water user groups may have in terms of contracts or direct and indirect water sales to other water user groups.
- o J) 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 "External Comments" field.

- "External Comments"- Lists additional descriptive information about the whole entity's purchased WUG supplies. Editable.

- "TransactionId"- Unique, numeric identifier that is assigned to each purchased whole WUG supply record stored in the database. This field is assigned by TWDB staff. Not editable.

- "Split WUG Total"- The sum of the WUG's geographic split volumes by seller, source, and transaction for decades 2020-2070. The Split WUG Total for the whole entity's geographic splits must equal the whole entity's WUG supplies for each purchased source. To refresh calculation after changes have been made on the page, click the **Update** button. Calculated fields. Not editable.

- "Uses"- All purchased sources from sellers associated with an entity are automatically displayed in the entity's WUG supply section. If a source is not being used as WUG supplies, the data entry user must uncheck the Uses checkbox next to the source. Editable.

- "Split WUG Supply"- Annual purchased supply volume used to meet each WUG's geographic split(s) internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.

- "External Comments"- Lists additional descriptive information about WUG geographic split's purchased WUG supplies for each seller, transaction, and source listed. Editable.

- "TransactionId"- Unique, numeric identifier that is assigned to each purchased split WUG supply record stored in the database. This field is assigned by TWDB staff. Not editable.

5.0 Data for Water Management Strategies

This section explains how to configure and enter data for water management strategies and projects in DB17. The structure of the database and data entry is intended to provide some flexibility while enforcing consistency in the meaning of the data and how it relates basic information. See section 5.7 for a list of WMS module application field descriptions. For instructions on how to use application functionality, click the hyperlink labeled **RWP Data Entry User Guide** located on the Help tab of the RWP application. The RWP Data Entry User Guide will be updated to include the WMS module functionality at the time of its release.

5.1 How the WMS Module Relates to Other RWP Application Modules

The strategy module is an extension of the Source and Entity application modules. It adds new capabilities for characterizing strategies that rely on:

1. source availabilities that remain unused

2. new availabilities (directly resulting from strategies)

3. unallocated existing entity surplus water volumes

4. existing WUG supplies that can be reduced and reallocated to other WUG entities

5. projected WUG water demands that can be reduced through conservation or drought management strategies

5.2 Desired Result of the WMS Module

The strategy module was designed with the goals of:

- ensuring that water management strategies do no over-allocate existing water supply availability or planned additional future availability;

- providing a straightforward statewide list of water management strategies that will meet WUG needs;

- reducing the confusion over what a "strategy" is vs. what a "project" is and limiting the ways to configure them both;

- structuring the data to allow hierarchies to be entered and detected;

- ensuring that the interdependencies between both projects and strategies can be easily represented and identified;

- promoting more accurate portrayals of how strategies and projects will be implemented;

- to minimize data entry, variability, and potential mistakes like unique labeling and naming conventions with unclear meanings unique to a specific region;

- focusing on meaningful attributes that can be used to more accurately label and portray information statewide; and

- improving data output for the purpose of regional prioritizations.

Data entered for strategies in DB17 will rely on "WMS Source Use Types" that are determined by how the strategy accesses water volumes or alters the demand. The mechanism of supplying water and the accounting and delivery of water will determine the "WMS description" (e.g., purchase, desalination, major reservoir, conservation) which will be applied when a WUG is related to a water management strategy. The structure is intended to avoid mixing concepts such as "type of source water" and "type of water management strategy" (e.g., conjunctive use is one type of WMS strategy that uses two types of source water).

Strategies (assignments of water to users) will then rely on "projects" that facilitate their implementation. Each project associated with a strategy(ies) will then have one or more "components" that help describe the project such as a well field, contract, pipeline, or new well.

Water management strategy data, including associated project information, entered by regional water planning groups into the state water planning database (DB17) is structured to facilitate providing discreet, independent project information at the sponsor-project-capital-cost level for use by the regional water planning groups for the purpose of regional prioritizations. This information (strategies and the project infrastructure and costs required to implement them) should be entered in the database in a way that best reflects how projects are anticipated to be implemented to meet identified water needs.

Data entry users will be able to create the following through the application:
- **Water Management Strategies**,
- **Projects**, and
- **WMS Groups**

When created, these data objects will be automatically added and will not require TWDB approval.

5.3 Water Management Strategies

A water management strategy is a method and associated accounting by which a water user group accesses future water supply (or manages demand). See Appendix M for a basic water management strategy diagram. Strategies may or may not require an associated project to be implemented (i.e., many strategies, such as "purchases", do not require any new or expanded infrastructure). To organize how water is allocated, water management strategies are divided into two main types:

- A **Source Water Management Strategy** can use or alter the total availability related to a source.

- An **Entity Water Management Strategy** can use existing entity surplus, reduce projected demand, and reduce allocated water user group existing supplies listed in the Entity module.

These WMS types are further divided into "WMS Source Use Type" sub categories. New water volumes made available through the water management strategy can be transferred to other water user group entities as WMS WUG supplies. A WMS Description will be applied when the WUG relates to a strategy. See Appendix N for a table matrix that describes how the WMS Types, Source Use Types and WMS Descriptions relate to each other. Only users with access to the water management strategies sponsor region will be able to edit WMS detail information, relate WMS sources, or projects. See sections 5.7.1 and 5.7.2 for a list of fields related to the WMS details application page.

5.3.1   WMS Type: Source WMS

A WMS Type of "Source WMS" has three WMS source use subtypes associated with it that identify if the water being used is from existing availability or future availability. A WMS with a type of Source WMS may be related to more than one source, but it can only be related to one of the following "WMS Source Use Types":

- Existing Availability
- Availability Increase
- Availability Decrease

5.3.1.1 WMS Source Use Type: Existing Availability

"Existing availability" water management strategies are akin to how entities were assigned water in the Entity Module in that they rely on existing, as-yet-uncommitted, availability in the Source Module.

Examples include:
- Groundwater development
- New water right permit

Source "Total Availability" water volume remaining after all related Entity module direct source volume-in has been deducted can be allocated to WUGs through one or more "Source WMS" that has a WMS Source Use Type of "Existing Availability". When a Source WMS with a source use type of "Existing Availability" is created, an application user can add one or more sources with a source future status of "both" to the strategy for its related WUGs to use as future WUG supply (see Appendix O for an example). WUGs related to a source through this type of strategy may not exceed its existing total available water volume.

5.3.1.2 WMS Source Use Type: Availability Increase

When a Source WMS is added with a source use type of "Availability Increase", it is understood that the WMS will be increasing the available water volume of an existing source or adding a new total available water volume to a future source.

Examples:

- New reservoir
- Reservoir Augmentation
- Unappropriated Flows
- Desalination
- Aquifer Storage and Recovery
- Reuse

Future sources, such as new reservoirs, are requested through the Source Module just like current sources. Future source requests will be reviewed by TWDB staff before being approved. When a Source WMS with a source use type of "Availability Increase" is created, an application user can add one or more sources with a future status of "future" or "both" to the strategy for the strategy's related WUGs to use as future WUG supply (see Appendix P for an example). By clicking on the hyperlinked related source name, the user will be taken to a future availability application page where they will enter the increase in water volume. If the source availability being increased is associated with a reservoir or system, the user will be asked if the availability increase is based on firm availability. If it is not, the user will need to also enter the firm availability increase. If the source has a source future status of "both", the modeling methodology entered should be consistent with what was entered in the source module. For example, if the reservoir's existing availability is based on firm yield in the Source module, it should also be based on firm yield in the "Increase in Availability" WMS.

WUGs related to this type of strategy may not exceed the total availability water volume increase established through the strategy. If you are adding a future reservoir that will function as part of an existing or future reservoir system, please contact TWDB Water Supply Strategy & Analysis staff and they will help you make the required changes.

5.3.1.3 WMS Source Use Type: Availability Decrease

This strategy type will be used when modeled existing total availability from one source is being transferred to another through a water management strategy. A decrease in availability will most likely accompany another strategy displaying a source increasing their availability to account for the transfer. Use of this type of strategy is only required when the available volume of water is not already associated with an entity in the entity module and is not required when a source is receiving water volumes that are in excess of the existing total availability such as "excess flows." An example of this type of strategy would be where a water right permit is changed and modeled total available water volume that has not been allocated to an entity in the Entity module is shifting from one part of a run-of-river source's basin to another.

When a Source WMS with a source use type of "Availability Decrease" is created, an application user can add one or more sources having a future status of "both" to the strategy. By clicking on the hyperlinked related source name, the user will be taken to a future availability application page where they will enter the decrease in water volume. The user will enter the volumes as a positive number, but the data will save as a negative number in the database. If the source availability being decreased is from a reservoir or system, the user will be asked if the availability decrease is based on firm availability. If it is not, the user will need to also enter the firm availability decrease. The modeling methodology entered should be consistent with what was entered in the source module. For example, if the reservoir's existing availability is based on firm yield in the Source module, it should also be based on firm yield in the "Decrease in Availability" WMS. WUGs will not be able to relate to a Source WMS with a source use type of "Availability Decrease" because the water volume entered will represent an availability loss from the source.

5.3.2   WMS Type: Entity WMS

A WMS Type of "Entity WMS" relies on shifts of an entity's water volumes or represents a reduction in a WUG's projected demand as a result of conservation efforts. With the exception of a demand reduction strategy where a water transfer is not involved, these types of strategies rely upon water volumes that were previously assigned to entities in the Entity Module as either "Direct Source Volume-In", "Entity Sales" or "Existing WUG Supplies". A WMS with a type of Entity WMS may be related to more than one entity, but it can only be related to one of the following "WMS Source Use Types":

- Existing Entity Surplus
- Supply Reduction by WUG
- Supply Reduction by WWP Customers
- Demand Reduction

5.3.2.1 WMS Source Use Type: Entity Existing Surplus

An entity WMS with a Source Use Type of "Existing Entity Surplus" relates to the remaining unallocated volume of water from a source that is assigned to the entity as either *direct source volume-in* or *purchased volume-in* after *WUG Supplies* and *Sales/Transfers* water volumes have been deducted (see Appendices Q & R for examples). Relating this water volume to a water management strategy will allow entities to access this water through new or altered contracts and/or new infrastructure.

Examples:
- Sales to future customers
- Increase in existing contract

When this type of strategy is created, an application user can add one or more entities to it. When an entity is related to a strategy, their entity name will be hyperlinked. The user can click

on the hyperlinked Entity Name to view a list of all of the sources that the entity receives water from in the Entity module through either the Direct Source Volume-In or the Entity Sales pages. The user may deselect any of the entity's sources where the entity either does not have a surplus or does not intend to transfer the surplus volume-in through the strategy. WUGs receiving future WUG supplies through this type of strategy will see only sources that remain selected for the entity and may not exceed the entity's unallocated surplus water volume for that source.

5.3.2.2 WMS Source Use Type: WUG Existing Supply Reduction

An Entity WMS with a source use type of "Supply Reduction by WUG" allows a WUG's existing WUG supplies to be reduced. The reduction in water volume may be transferred to another WUG entity that is related to the WMS (See Appendix S for an example). Water volumes that have been associated with WUG supplies in the Entity module cannot be directly transferred to another user as an Existing Entity Surplus strategy. Instead, this type of strategy will need to be set up to illustrate the relationship between the WUG reducing its existing supplies and the other WUG receiving the supply reduction water volumes.

Examples:
- Groundwater Reduction Plan (e.g., in Region H)
- Reallocation of existing supplies by WWP

When this type of strategy is created, an application user can add one or more entities to it. When an entity is related to the strategy, their entity name will be hyperlinked. The user can click on the hyperlinked Entity Name to view a list of all of its WUG supply sources and deselect any of the sources that will not be reduced. They will then enter the water volumes by source that the WUG entity plans to reduce. If other WUGs are receiving future WUG supplies through this type of strategy, the receiving WUG's related WMS WUG supplies will only see the selected sources and may not exceed the amount of existing WUG supply that is being reduced by the supply reduction WUG entity.

5.3.2.3 WMS Source Use Type: WWP Customer WUG Existing Supply Reduction

An Entity WMS with a source use type of "Supply Reduction by WWP Customers" is similar to the source use type "Supply Reduction by WUG" described in section 5.3.2.2. When a WWP or seller's customers are reducing their supply of one or more sources, a "Supply Reduction by WWP Customer" strategy type will allow the user to select a WWP or Seller entity from a list, then all of the seller's WUG customers that were previously related through the Entity module's Entity Sales page will display with the selected WWP or seller. When the user clicks on each customer's hyperlinked entity name, they will be taken to a page that will display all of the sources sold to them by the selected seller that are used as existing WUG supplies. Sources added that will not be reduced may be deselected. If the reduced water volumes will be transferred to another WUG entity, the water volumes reduced by the seller's customers will be assigned back to the initially selected WWP or Seller. WUGs receiving future WUG supplies will

be related to the seller and the source and they may not exceed the amount of water volume that the seller's customers have reduced their supplies by (see Appendix T).

5.3.2.4 WMS Source Use Type: WUG Projected Demand Reduction

An Entity WMS with a source use type of "Demand Reduction" will reduce the WUG entity's projected demand (See Appendix U for an example).

Examples:

- Conservation strategy
- Drought strategy
- Brush control strategy

Please specify whether the demand reduction strategy is based on conservation or drought management in the water management strategy name. When an Entity WMS with a source use type of "Demand Reduction" is created, an application user can add one or more entities to it. When an entity is related to a strategy, their entity name will be hyperlinked. The user can click on the hyperlinked Entity Name to enter the total reduction in projected water demand. The total water demand reduction will need to be entered at the whole entity level and then allocated to its related WUG splits. If the entity will not transfer any of the water savings to another WUG entity, they can use an application button labeled **Copy to Used by this Entity** to copy the total demand reduction volumes to the fields labeled "Demand Reduction Used By this Entity". If the water savings made available through the demand reduction strategy will be transferred to another entity as future WUG supplies, please contact TWDB Water Supply Strategy & Analysis. They will assist you with setting up the strategy to allow the transfer to occur during the 2016 regional water planning cycle (for an example of demand reduction transfer see Appendix V).

5.3.3 Allocating WMS Supplies to Water User Groups

Only entities having an Entity Type of "WUG", "WUG/Seller" or "WUG/WWP" can relate to a strategy and receive WMS water volumes to meet their needs. If a strategy is being sponsored by an entity having an Entity Type of "WWP" or "Seller", WMS water volumes unassigned to WUGs can still be allocated to that entity (see section 5.3.3.3). Once a water management strategy has been created and WMS sources or Entity/Sources are established, in most cases a WUG entity can be attached to the strategy directly through the WMS Detail page or through the WMS WUG Supply List page. The exceptions are:

- water volumes associated with a source use type of "Availability Decrease" sources cannot be transferred to WUGs and

- strategies with a source use type of "demand reduction" must first have sources related to it in order for the conserved water volumes to be transferred. If a demand reduction transfer needs to be set up, please contact TWDB Water Supply Strategy & Analysis staff

and they will assist you with setting up this type of strategy for the 2016 regional water planning cycle.

By relating a WUG entity to a WMS so that it can access its related water volumes, all of the WUG's geographic splits will be automatically added to the strategy. Each source or entity/source combination that has been added to the WMS will automatically relate to all of the WUG entities and their geographic splits that will be receiving the future water supplies from the water management strategy (see Appendix W diagram). WUGs may be related to a WMS through either the WUG's WMS WUG Supply page or the WMS Detail page. When a WUG is related as a recipient through the WMS Details page, only users with access to the WUG entity's primary region may enter the WMS WUG supply volumes received by the entity. Each time a WUG is related to a WMS, a WMS description value will need to be chosen for each source or entity/source combination so that the WMS water volumes can be categorized.

5.3.3.1 Relating WUGs to a WMS One at a Time

WUGs can be related to a strategy one at a time by clicking the **Add WUG Supply** button. When the button is clicked, the application user will be asked if the WUG will receive the WMS WUG supply directly or through a WWP or Seller. If the WUG directly accesses the future WUG supplies they will receive from the strategy, the application user will then select the name of the WUG being related to the strategy and it will be added. If the WUG is transferred or purchases the WMS WUG supplies from WWP or seller entity, in the first pop-up they will select the WUG receiving the WMS WUG supplies and then in the second pop-up window, the user will select the entity that transfers or sells the water to them. If the WMS WUG entity receives the water after a series of buy/sale relationships where more than one seller is involved with getting the WMS WUG supplies to the recipient WUG, choose the seller that the WUG directly receives the water from.

5.3.3.2 Relating Multiple WUGs to a WMS through their Relationship with a WWP or Seller

Multiple WUGs can be related to a strategy at the same time through their relationship to a WWP or seller in the Entity module's Entity Sales page. The application user will click on the button labeled **Add WUG Customers Related to WWP or Seller**, they will then choose the WWP or seller whose customers they want to relate to the strategy and all WUGs related to the WWP or seller entity through the entity sales page will be automatically related to the strategy and the WWP/Seller's name will be listed as the seller entity. WUGs can be removed individually if they are automatically related to the strategy, but do not intend to use it for future WUG supplies.

5.3.3.3 Assigning Future Customer WUG WMS Water Volumes

Future customer entities will be created for each WWP or seller. The name of the entity will be the Entity's name and the text "Unassigned Volumes". If there are unassigned WMS water volumes that have been made available through a WMS, they can be assigned back to a WWP or seller through this type of WUG entity.

5.3.3.4 Addressing Water Loss

Contact TWDB WSSA staff if you need to account for water loss. Not all situations will be addressed the same way in the application and they will help you determine how the data should be entered.

5.3.3.5 Entering WMS WUG Supplies

Each WUG will have a WMS WUG Details page. Application users with access to the WUG's primary region can add/edit the WMS WUG supply and its related information. For a list of all related WMS WUG supply fields see section 5.7.3. Any WUG or WUG geographic splits that are added to a WMS source that will not be using it can be deselected using the checkboxes provided. WUGs related to a water management strategy's source may not exceed the volume of water available. Water volume remaining calculated fields are provided in the WMS WUG Supply details page and they will notify the user when the available volume has been exceeded by highlighting the related water volumes in red. For a list of the calculations by source use type see section 5.7.3.

5.3.4   WMS State Water Plan Status

Each water management strategy will have a WMS status type associated with it that will determine if the WMS is considered to be "recommended" or "alternative" in the State Water Plan. WMS status will be applied at the WMS level when a strategy is not related to any WUGs that will be receiving water volume from the strategy. Examples of these types of strategies are:

- strategies with a WMS source use type of "Availability Decrease";

- demand reduction strategies where the water savings will not be transferred to another WUG; and

- WUG supply reduction strategies where the reduction in WUG supplies will not be transferred to another WUG.

The ability to apply a WMS status at the water management strategy level was not built in the 2016 version of the Regional Water Planning application. TWDB Water Supply Strategy & Analysis staff will help you apply the WMS status at this level. All WUGs receiving water volume from a WMS will enter a WMS status of "recommended" or "alternative" for each strategy that they are related to. The default status will always be "recommended." If all related WUGs have a WMS status of "alternative" the strategy will be considered "alternative." If at least one WUG has a WMS status of "recommended," the strategy will be considered recommended. See Appendix X.

5.4 Projects

Projects are the means of portraying and associating information about infrastructure components, costs that must be identified, sponsors, and the actions that need be taken for a strategy(ies) to be implemented (see Appendix Y figures).

In database parlance, a "project":

- is a self-contained set of components/actions;

- is listed independently of other projects but may or may not rely on other projects being implemented;

- will generally be associated with a single water supply facility and implemented by a single sponsor entity;

- is always considered integral to and a part of at least one recommended water management strategy that is dependent on the project being implemented;

- may be integral to multiple water management strategies and/or water user groups that are dependent on the project being implemented;

- may rely on other projects being implemented;

- must include one or more components/elements including, for example: contract; and/or infrastructure development, and associated capital cost (see sections 5.4.1 and 5.4.2 below);

- describe what significant action(s) must be executed and/or what new infrastructure must be developed to make the strategies relying on it successful (does not necessarily have an associated capital cost);

- do not have to have a capital cost - but every capital cost must be associated with a project;

- often have a capital costs which may only be associate with a single project-sponsor and must be associated with a project (which is, in turn, associated with a sponsor).

- will generally be implemented at one time by a single borrower and can be implemented separately from other projects (i.e., generally can't be logically subdivided into separate projects that are implemented separately by more than one entity or at different times or under separate financing) even if the water it happens to rely water being provided by another project;

- construction of which would generally be financed under a single loan amount taken out at one time (usually by one sponsor); and,

- can be used as a means of more accurately reflecting anticipated relationships and dependencies between sponsors and strategies, for example, allowing bundling of sponsors and capital costs together, in certain instances, so that they can be related to one or more water management strategies, as appropriate.

5.4.1   Project Sponsors

One or more entities can be related to a project as "project sponsors." Project sponsors are responsible for providing the project's capital cost and a capital cost value will need to be entered for each sponsor listed.

5.4.2   Project Components

Project components are the necessary actions or infrastructure elements required to convey the water provided by a water management strategy. A project can be associated with one or more components. For a complete list of components see Appendix Z.

5.4.3   Relating a project to a WMS

One or more projects can be related to a WMS at either the strategy level or the strategy's recipient WUG level as a "WMS transaction project". A WMS may exist without a project, but a project must be related to a WMS. When a project is related to a WMS at the strategy level, this implies that all WUGs dependent upon that strategy are also dependent upon the project's implementation. When a project is related to the strategy's recipient WUG level, this implies that only the WUG's receiving the water from the strategy that are related to the project are dependent upon it. An example of when a project would be related to a specific WUG(s) is when many WUGs will be receiving water from a new source, but on a few WUGs will be dependent upon a new pipeline being built to access the new source. The other WUGs associated with the new source strategy that are not dependent upon the strategy already have adequate infrastructure in place to access it. See Appendix AA.

5.4.3.1 WMS Project State Water Plan Status

Each project will be assigned a WMS Project Status of either "recommended" or "alternative" when it is related to a water management strategy. The WMS Project Status will always default to "recommended." If each time a project is related to a strategy the status is "alternative", then the project will be considered "alternative." If the project is related to at least one water management strategy where the status entered is "recommended", the project will be considered recommended. See Appendix AB.

5.4.3.2 WMS Project Hierarchies

When more than one project is related to a water management strategy, a tier order will be added to show the order of implementation. In the example in Appendix AC, Project 1 must be implemented first, then Projects 2 & 3 together (see Appendix AC figure).

5.5 WMS Groups

Due to the way the Regional Water Planning application is structured there are times when a strategy must be separated into more than one water management strategy because of how the data is structured even though the Regional Water Plan identifies all related sources as a single water management strategy. To help identify these relationships, one or more water management strategies can be assigned to a WMS Group. A water management strategy may only be assigned to one WMS group at a time (see Appendix AD).

5.5.1   WMS Group Hierarchies

When more than one water management strategy is related to a WMS Group, a tier order will be added to show the order of implementation. In the example in Appendix AE, WMS 1 & 2 must be implemented together. WMS 3 would be implemented after them (see Appendix AE figure).

5.6 Additional WMS Data Entry Guidance

5.6.1 Setting Up WMS Data

Before entering data into the WMS application, it is recommended that you first identify water management strategies and determine if they are a WMS Type of "Source WMS" or "Entity WMS." Then determine which source use type will be required. If multiple related strategies are required because they are reliant on different WMS Source Use Type categories, a WMS group may be required. If a project is needed, decide if the project should be assigned at the WMS level or the WMS WUG supply transaction level. After thinking through how a water management strategy and its related projects should be entered into the application, the following steps demonstrate a data entry order that can be followed:

1) Add "projects" required by water management strategies

2) Add a "water management strategy"

3) Relate either sources or entities to the water management strategy to set up the sources of water that other WUG entities will relate to and use as WMS WUG supply water volumes.

4) Relate WUGs to the WMS so that they can access the WMS water volumes

5) Relate projects to the WMS level or the WMS WUG Supply level (WMS transaction projects)

6) Relate water management strategies together in groups, if required

Similar to the entity module, it is advised to set up the relationships before entering the water volumes related to the water management strategy. Once water volume values are added, the application will require that they updated to NULL or no value before records can be unchecked or deleted to prevent the accidental deletion of data. If you have difficulty determining how to set up a water management strategy or deleting data, please contact TWDB Water Supply Strategy & Analysis staff and they will assist you.

5.6.2 Source Over-Allocations

Source over-allocations are calculated by taking the total availability entered for the source by decade, adding to it any recommended water management strategies that increase the availability and deducting from it: the sum of all direct source volume-in associated with the source, recommended strategies that decrease the availability of the source, and WUGs that use as a recommended water management strategy WUG supplies that either comes from remaining existing availability or an increase in availability.

5.6.3 WUG Unmet Needs

Total existing and future WUG supplies are calculated by adding the sum of all existing supplies associated with each WUG split to the sum of all recommended water management strategy supplies associated with each WUG split, then deducting from that total any recommended WUG supply reduction strategies or recommended demand reduction transfer strategies. Projected demands are adjusted by taking the approved projected demands by WUG split and

reducing them by any recommended demand reduction strategies. Then the projected demands are deducted from the total existing and future WUG supplies to calculate the split WUGs unmet needs.

5.6.4   Regional Prioritizations

Only those recommended projects on which recommended water management strategies rely having capital costs will be prioritized by the regional water planning groups. For the purpose of HB 4 regional prioritizations, most projects will be defined in the data by each individual project sponsor and the capital costs that they are responsible for.

The regional prioritizations shall be performed on a project list provided by TWDB that is generated directly from the project information entered into DB17 by regional water planning groups. Every capital cost will be associated with a project. Only those projects that are recommended and that have capital costs will be included in the regional prioritizations list generated from DB17.

Projects/strategies may not be bundled if they are considered separate projects and could be implemented separately. For example, two groundwater well projects that would serve two different entities and are entirely separate physically shouldn't be entered as a single project for prioritization. The reason for this is that each project could be built independently and at different times and there would not be a single borrower to implement those two projects.

5.6.5   Out-of-State Sources

An out-of-state water source should be added to DB17 as future water source unless that water source is already being used by a WUG within the DB17 Entity Module. If the out-of-state source is future only, it should be added as a SourceWMS: Increase in Availability and only the amount of water available to Texas for use should be added as future availability. WUGs using the water will be related to the WMS. Any infrastructure needs will be added and associated to strategies and entities as projects.

5.6.6   Groundwater Overdrafts

Groundwater Overdrafts (relying on groundwater for a volume of water supply that, in total, would exceed the availability of a particular groundwater source at the aquifer-county-basin level) are not allowed. See section 5.6.2 for a description of how source over-allocations will be calculated.

5.6.7   Aquifer Storage and Recovery/Artificial Aquifer Recharge

5.6.7.1 Aquifer Storage and Recovery

Aquifer storage and recovery (ASR) is a specific type of AR practiced with the purpose of both augmenting ground water resources and recovering the water in the future for various uses (United States Environmental Protection Agency, 2015).

ASR sources associated with a WMS that are not currently online will involve creating a new source which may be thought of in DB17 somewhat like surface water reservoirs except the original source of the water must also be indicated.

A new, unique source must be created in DB17 for the purposes of accounting for the ASR water availability (akin to the new availability of a new surface water reservoir). When creating a new ASR source in the RWP Application's Source module, please use the following format:

Source Name: *[Name of storage aquifer] + ASR*

Source Detail: *The name of the ASR facility if there is one, leave blank if there is not one*

Source Type: *Other Local (We do not have a source type for ASR yet, in the meantime choose this one)*

Region: *(Region where ASR is located)*

County: *(County where ASR is located)*

Basin: *(Basin where ASR is located)*

Source Comments: *Please list the original source that the ASR is coming from.*

Source Future Status:

- *"Future" if ASR is only available to users through a water management strategy.*

- *"Both" if the ASR source is currently used as WUG existing supply and is also used in a WMS.*

- *"Existing" if the ASR source is currently used as WUG existing supply, but the source is not used in a WMS.*

<u>Information regarding the original source water that is stored in the aquifer for use during drought must be included in the source comments section</u>. This will likely be surface water (e.g., run-of-river), groundwater from another formation, or groundwater from the same formation. ASR sources that already exist may be used by entities in the Entity module as current supplies or in the WMS module as future supplies. If a new ASR source is being implemented or the volume of an existing ASR is being increased through a water management strategy, a "Source WMS" with a source use type of "Availability Increase" (see section 5.3.1.2) will need to be created. The ASR source receiving the future availability will need to be added to the strategy and the total increase in availability will be associated with the source. WUGs receiving the ASR water will relate to the "Availability Increase" strategy and may use only the future availability that has been increased through the strategy.

5.6.7.2 Artificial Aquifer Recharge

Artificial aquifer recharge (AR) is the enhancement of natural ground water supplies using man-made conveyances such as infiltration basins or injection wells (EPA, 2015). If an existing groundwater source that is listed in the Source module has an increase in availability due to an aquifer recharge project, a "Source WMS" with a source use type of "Availability Increase" (see section 5.3.1.2) will need to be created. The groundwater source receiving the future availability will need to be added to the strategy and the total increase in availability will be associated with the source. The origin of the source should be included in the page where the "Availability Increase" is entered. WUGs receiving the AR water will relate to the "Availability

Increase" strategy and may use only the future availability that has been increased through the strategy.

5.6.8 Conjunctive Use

Conjunctive use is the combined use of different water sources, usually groundwater and surface water, which optimizes the beneficial characteristics of each source. A WMS project that uses surface water most of the time but relies on groundwater to firm up a strategy supply through drought conditions will be labeled in DB17 as a "conjunctive use" WMS. WUGs related to a "conjunctive use" WMS will be automatically related to all of the sources that are related to the WMS. In the WMS WUG supply page, for every WUG and WMS source combination, a WMS description of "conjunctive use" will need to be chosen when it applies.

5.6.9 Temporary: Bottled/Trucked in Water

If water is coming from within Texas it should be treated as either:

a) an Entity WMS: Existing Entity Surplus strategy if the entity transferring the water already has it listed as part of their entity volume-in; or

b) a Source WMS: Existing Availability strategy if the volume being transferred is still part of the total availability of the source.

If it is coming from outside the state, it would be considered a Source WMS: Increase in Availability and the Temporary: Bottled/Trucked in Water could be considered a future source.

5.6.10 Water Loss Reduction Strategy

When an entity receives "Volume-In" (see section 4.3.2 for "Volume-In" explanation) either directly, purchased or transferred through the RWP application's Entity Module Direct Source Volume-In page or the Entity Sales page and that volume is not accessible for use or sale because of water loss during delivery, it should be left with the entity as volume-in and not used as WUG supplies or sold. Some exceptions may apply. Please contact the TWDB Water Supply Strategy and Analysis staff if you need guidance on how to set up your water management strategy. An Entity WMS with a type of "Existing Surplus" will need to be created so that the Entity may relate the surplus water volumes to a WMS project having a component like "Canal Lining". WUGs can then relate to this type of strategy and use the remaining "entity surplus" that has been made accessible through the WMS project.

5.7 WMS Module Data Fields

5.7.1 Description of WMS Type: "Source WMS" Data Entry Fields

This page can be accessed when the user clicks on the WMS Listing button and clicks the button labeled **Create New WMS Source Strategy** or clicks on a hyperlinked water management strategy name that has a WMS type of "Source WMS".

- **WMS Source Use Type**- When the user chooses to add a Source WMS strategy they will be limited to the following three source use types: "Availability Increase", "Availability Decrease", and "Existing Availability." Once the WMS has been created, the source use type cannot be changed. Editability is conditional. Field is required.

- **WMS Name**- Each water management strategy must be given a name that describes the water management strategy. The WMS name can be a total of 100 characters in length. Editable, required field.

- **WMS SWP Name**-This field will be populated by TWDB staff. Not editable.

- **WMS Sponsor Region**- Identifying letter (A through P) of the region water planning group that will act as the lead sponsor of the water management strategy. The WMS sponsor region will need to coordinate with other regions when setting up a WMS. Only application users with access to the WMS sponsor's region, will be able to add or remove WMS sources, related WMS entities, and projects through the WMS page or edit WMS source information. However, regardless of sponsor or primary region, any Project or WMS WUG can relate to a water management strategy. Editable, required field.

- **WMS Recommendation Type**- The recommendation type field or what we refer to as "WMS Status" is deduced. If at least one WMS WUG is related to a WMS as "recommended", its recommendation type is deduced as "recommended". If all WMS WUGs are related to a WMS as "alternative", its recommendation type is deduced as "alternative." For WMS source use type strategies like "Decrease in Availability" which will not have a WMS WUG associated with it, the TWDB Water Supply Strategy and Analysis staff will assist you in entering a recommendation type. Not editable.

- **WMS Unit Costs** – The first decade unit costs related to a water management strategy as a whole calculated prior to water distribution to the water management strategies related WUGs. Editable.

- **WMS Comments**- Optional field used to provide additional comments from the planning groups pertaining to the water management strategy. Editable.

- **Relating a WMS to a WMS Group**– Once a Source WMS is created, the user can click on the button labeled **Relate WMS to WMS Group**. When the button is clicked, the

user can select a WMS group from a pop-up list containing all potential WMS groups to relate the water management strategy to. A WMS may be related to only one WMS group.

- **Relating Sources to a Source WMS**- Once a Source WMS is created, the user can click on the button labeled **Add Source**. When the button is clicked, the user can select a source or sources to relate to the water management strategy. When the Source WMS has a source use type of "Availability Increase," the user will choose from a list of sources that have a source future status of "both" or "future." When the Source WMS has a source use type of "Availability Decrease" or "Existing Availability," the user will choose from a list of sources that have a source future status of "both." The source future status of "both" means that the source is being used as existing supply and in a WMS.

- **WMS Related WUGs**- Once a Source WMS is created, application users with access to the WMS sponsor region will be able to relate to it one or more WUGs from any region when the WMS Source Use Type is "Availability Increase" or "Existing Availability". The user may add WUGs a few at a time using the button labeled **Add WUG Supply** (see section 5.3.3.1 for additional information) or add multiple WUGs based on their relationship to a WWP or Seller by clicking on the button **Add WUG Customers Related to a WWP or Seller** (see section 5.3.3.2 for additional information).

- **WMS Related Projects** – One or more projects can be related to a WMS through the WMS Details page. When a project is related to the WMS level, it is assumed that all WUGs related to the WMS are dependent upon the project.

  - **WMS Project Recommendation Type** – When a project is related to a WMS, the user must select a WMS Project status of "recommended" or "alternative".

  - **WMS Project Tier** – When more than one project is related to a WMS, a project tier value will be required to identify the order in which the related projects must be implemented. If two projects are on the same tier, you may enter the same number twice. If all projects must be implemented at the same time, they will all receive a value of "1".

5.7.1.1 Description of Availability Increase Data Entry Fields

This application page will only be accessible when a WMS Source Use Type is "Availability Increase." The page can be accessed when the user clicks on a WMS related source's hyperlinked name.

- **Future Total Availability Increase**-If the source is new, enter its total availability water volumes in acre-feet for decades 2020-2070. If the source exists in the

Source module and currently has total availability water volumes associated with it, but the WMS will increase the total availability water volume, enter the increase in total availability water volume for decades 2020-2070. Editable.

- **Conservation Pool**- This field only displays when the source type is "Reservoir." If the source is a new reservoir, enter the reservoir's planned conservation pool capacity, in acre-feet. If a WMS project will cause the reservoir's conservation pool capacity to increase, you may enter the planned future conservation pool capacity, in acre-feet. Editable.

- **Is Future Total Availability Based on Firm Yield?** – This field only displays when the source type is "Reservoir" or "System." Users will address whether the Future Total Availability Increase water volumes (2020-2070) are based on firm yield. If the source listed is an existing source, the same methodology for determining existing availability should be used to determine the future availability. Editable.

- **Future Firm Yield Increase**- If the Future Total Availability Increase (2020-2070) is not based on firm yield for reservoirs and the lake/reservoir surface water components of systems, list the value for the increase in total firm annual amounts in acre-feet of water available from sources for years 2020, 2030, 2040, 2050, 2060 and 2070. If a source is a lake or reservoir, the value will be the total firm yield increase. If the value entered is based on an operational procedure, it should not exceed the increase in firm yield of the lake or reservoir under drought-of-record conditions, except when documented system operations yield system gains. This field will only be visible and editable in the application if "N" is selected from the **Is Future Total Availability Based on Firm Yield?** field. Editability is conditional.

- **Increase in Availability Comments**- An editable field that is optional for providing additional comments from the planning groups pertaining to the WMS Source with an increase in availability. Editable.

5.7.1.2 Description of Availability Decrease Data Entry Fields

This application page will only be accessible when a WMS Source Use Type is "Availability Increase." The page can be accessed when the user clicks on a WMS related source's hyperlinked name.

- **Future Total Availability Decrease**- Enter the water volume that the existing source's availability will decrease by in acre-feet for decades 2020-2070. Editable.

- **Conservation Pool**- If a WMS project will cause the reservoir's conservation pool capacity to decrease, you may enter the planned future conservation pool capacity, in acre-feet. Editable.

- **Is Future Total Availability Based on Firm Yield**-Indicates whether the Future Total Availability Decrease water volumes (2020-2070) are based on firm yield. If the source listed is an existing source, the same methodology for determining existing availability should be used to determine the future availability. If the source listed is an existing source, the same methodology for determining existing availability should be used to determine the future availability. Editable.

- **Future Firm Yield Decrease**- This field only displays when the source type is "Reservoir" or "System." If the Future Total Availability Decrease (2020-2070) is not based on firm yield for reservoirs and the lake/reservoir surface water components of systems, list the value for the decrease in total firm annual amounts in acre-feet of water available from sources for years 2020, 2030, 2040, 2050, 2060 and 2070. This field will only be visible and editable in the application if "N" is selected from the **Is Future Total Availability Based on Firm Yield?** field. Editability is conditional.

- **Decrease in Availability Comments**- An editable field that is optional for providing additional comments from the planning groups pertaining to the WMS Source with a decrease in availability. Editable.

5.7.2   Description of WMS Type: "Entity WMS" Data Entry Fields

This page can be accessed when the user clicks on the WMS Listing button and clicks the button labeled **Create New WMS Entity Strategy** or clicks on a hyperlinked water management strategy name that has a WMS type of "Entity WMS".

- **WMS Source Use Type**- When the user chooses to add an EntityWMS strategy they will be limited to the following four source use types: "Supply Reduction by WUG", "Supply Reduction by WWP/Seller Customers", "Demand Reduction", and "Existing Entity Surplus". Once the WMS has been created the source use type cannot be changed. Editability is conditional. Field is required.

- **WMS Name**- Each water management strategy must be given a name that describes the water management strategy. The WMS name can be a total of 100 characters in length. Editable, required field.

- **WMS SWP Name**- This field will be populated by TWDB staff. Not editable.

- **WMS Sponsor Region**- Identifying letter (A through P) of the region water planning group that will act as the lead sponsor of the water management strategy. The WMS sponsor region will need to coordinate with other regions when setting up a WMS. Only application users with access to the WMS's sponsor region, will be able to add

or remove WMS related Entity/Sources, WUGs, and projects through the WMS page or edit WMS source information. However, regardless of sponsor or primary region, any Project or WUG can relate to a water management strategy. Editable, required field.

- **WMS Recommendation Type**- The recommendation type field or what we refer to as "WMS Status" is deduced. If at least one WMS WUG is related to a WMS as "recommended", its recommendation type is deduced as "recommended". If all WMS WUGs are related to a WMS as "alternative", its recommendation type is deduced as "alternative." For WMS source use type strategies like "Decrease in Availability" which will not have a WMS WUG associated with it, TWDB staff will assist you in entering a recommendation type. Not editable.

- **WMS Unit Costs** – The first decade unit costs related to a water management strategy as a whole calculated prior to water distribution to the water management strategies related WUGs. Editable.

- **WMS Comments**- An editable field that is optional for providing additional comments from the planning groups pertaining to the water management strategy. Editable.

- **Related WMS Group** – Once a Source WMS is created, the user can click on the button labeled **Relate WMS to WMS Group**. When the button is clicked, the user can select a WMS group from a pop-up list containing all potential WMS groups to relate the water management strategy to. A WMS may be related to only one WMS group.

- **Relating Entities to an Entity WMS**- Once an Entity WMS is created, application users with access to the WMS sponsor region will be able to relate to it one or more entities from any region. The entity list will be different for each of the Entity WMS Source Use Types. Entity WMS with a WMS Source Use Type of "Demand Reduction" or "Supply reduction by WUG" will only be able to relate to entities with a type of "WUG", "WUG/WWP", or "WUG/Seller". If the WMS Source Use Type is "Supply Reduction by WWP/Seller Customers", the entity list will only contain entities with a type of "WUG/WWP", "WUG/Seller", "WWP", or "Seller". If the WMS Source Use Type is "Existing Entity Surplus", all active entities will be listed.

- **WMS Related WUGs** - Once an Entity WMS is created, application users with access to the WMS sponsor region will be able to relate to it one or more WUGs from any region unless the WMS Source Use Type is "Demand Reduction" and the water savings is not being transferred. The user may add WUGs a few at a time using the button labeled **Add WUG Supply** (see section 5.3.3.1 for additional information) or add multiple WUGs based on their relationship to a WWP or Seller by clicking on the

button **Add WUG Customers Related to a WWP or Seller** (see section 5.3.3.2 for additional information).

- **WMS Related Projects** – One or more projects can be related to a WMS through the WMS Details page. When a project is related to the WMS level, it is assumed that all WUGs related to the WMS are dependent upon the project.

  - **WMS Project Recommendation Type** – When a project is related to a WMS, the user must select a WMS Project status of "recommended" or "alternative".
  - **WMS Project Tier** – When more than one project is related to a WMS, a project tier value will be required to identify the order in which the related projects must be implemented. If two projects are on the same tier, you may enter the same number twice. If all projects must be implemented at the same time, they will all receive a value of "1".

5.7.2.1 Description of Demand Reduction Data Entry Fields

This application page will only be accessible when a WMS Source Use Type is "Demand Reduction." The page can be accessed when the user clicks on a WMS related entity's hyperlinked name in the section labeled "WUGs Reducing Projected Water Demands".

- **Existing Demand Total Whole WUG**- The WUG entity's current aggregated projected demand in acre-feet for decades 2020-2070. Not editable.
- **Existing Demand Total Split WUG**- The WUG entity's current split WUG projected demand in acre-feet for decades 2020-2070. Not editable.
- **Demand Reduction: Whole WUG**-The total amount of projected demand that will be reduced if the strategy is implemented for the whole WUG in acre-feet for decades 2020-2070. Not editable.
- **Demand Reduction: Split WUG Total**-Calculated fields. The sum of all demand reduction by split in acre-feet for decades 2020-2070. This calculated total will be compared to the "Whole WUG Demand Reduction" values to ensure that they are equal in every decade. When the sum of the "Split WUG Demand Reduction" values do not match the whole WUG demand reduction in any decade, the decades not matching will highlight in red. Not editable.
- **Demand Reduction: Split WUG-** The total amount of demand that will be reduced if the strategy is implemented for the WUG splits in acre-feet for decades 2020-2070. If the WUG split will not reduce its demand, uncheck the "Include" checkbox. Editable.
- **Demand reduction Used by Entity: Whole WUG**- The amount of the demand reduction that will reduce the Whole WUG's demand in acre-feet for decades

2020-2070. This amount will be the same as the "Demand Reduction: Whole WUG" if the conserved water volumes will <u>not</u> be transferred to another entity. Editable.

- **Demand reduction Used by Entity: Split WUG Total**-Calculated fields. The sum of all demand reduction used by split in acre-feet for decades 2020-2070. This calculated total will be compared to the "Whole WUG Demand Reduction Used by Entity" values to ensure that they are equal in every decade. When the sum of the "Split WUG Demand Reduction Used Total" does not match the "Whole WUG Demand Reduction Used by Entity" values in any decade, the decades not matching will highlight in red. Not editable.

- **Demand reduction Used by Entity: Split WUG**-The amount of the demand reduction that will reduce the Split WUG's demand in acre-feet for decades 2020-2070. This amount will be the same as the "Demand Reduction: Split WUG" if the conserved water volumes will not be transferred to another entity. If the WUG will not reduce its demand or apply the demand reduction to itself, uncheck the "Include" checkbox.

- **Transfer Conserved Water Volumes? Yes/No**-This field will not be editable for 2016 Regional Water Plan data entry. If you wish to set up data related to a water transfer that is dependent upon a demand reduction strategy, please contact TWDB Water Supply Strategy & Analysis staff and they will help you set up this strategy. Not editable.

5.7.2.2 Description of Supply Reduction by WUG Data Entry Fields

This application page will only be accessible when a WMS Source Use Type is "Supply Reduction by WUG." When the WMS Source Use Type is "Supply Reduction by WUG," it can be accessed when the user clicks on the related entity's hyperlinked name under the section labeled "WUGs Reducing Existing Supplies."

- **WUG Reducing Existing WUG Supplies Attribute Information**- Information describing the whole WUG entity whose WUG splits will be reducing their existing supply on one or more sources. Not editable.

- **WUG Reducing Existing WUG Supplies: Total Whole WUG Supply**- Whole WUG entity's aggregated existing supplies by decade, in acre-feet that is entered in the Entity WUG Supply page of the Entity module. Calculated. Not editable.

- **WUG Reducing Existing WUG Supplies: Total Supply Reduction**- Whole WUG entity's aggregated existing supplies being reduced by the entity that is entered for the strategy listed on the page. Calculated. Not editable.

- **WUG Supply Reduction Source** – Each source is listed that was used as WUG existing supplies in the Entity WUG Supply page of the Entity module. Not editable. See Section 3.5 for a list of source attribute descriptions.

- **Existing Supply: Source Total** – Whole WUG entity's aggregated existing supplies by source by decade, in acre-feet that is entered in the Entity WUG Supply page of the Entity module. Calculated. Not editable.

- **Existing Supply: Split WUG Total** – Split WUG's aggregated existing supplies by source by decade, in acre-feet that is entered in the Entity WUG Supply page of the Entity module. Calculated. Not editable.

- **Supply Reduction: Total by Whole WUG/Source**- Total water volume by decade in acre-feet that the whole WUG entity plans to reduce their WUG supplies by source. Editable.

- **Supply Reduction: Total by Whole WUG/Source (Checkbox)** - By unchecking this checkbox, the user is saying that the whole WUG entity related to the WMS/Source combination will not be reducing its existing WUG Supply. Unchecking this checkbox will result in the unchecking of all of its related WUG geographic splits. All of the whole WUG and split WUG values related to the WMS/Source combination must be NULL or blank in order for the checkbox to be unchecked. Editable.

- **Supply Reduction: Split WUG Total by Source**- Calculated sum by decade in acre-feet of all split WUGs that plan to reduce their WUG supplies by source. Decadal volumes must equal the total volume entered for the whole WUG entity. If the water volumes do not match in any decade, the cells will highlight red. Calculated. Not editable.

- **Supply Reduction: Split WUG by Source**- Total water volume by decade in acre-feet that the split WUG plans to reduce their WUG supplies by source. Split WUG supply reduced by source may not exceed the total existing WUG supply by source for the split WUG entity. If existing WUG supply volumes are exceeded in any decade, the values will highlight red. Editable.

- **Supply Reduction: Split WUG by Source (Checkbox)**- By unchecking this checkbox, the user is saying that the split WUG related to the WMS/Source combination will not be reducing its existing WUG Supply. All of the split WUG values related to the WMS/Source combination must be NULL or blank in order for the checkbox to be unchecked. Editable.

5.7.2.3 Description of Supply Reduction by WWP/Seller WUG Customers Data Entry Fields

This application page will only be accessible when a WMS Source Use Type is "Supply Reduction by WWP/Seller Customers." When the WMS Source Use Type is "Supply Reduction by WWP/Seller Customers" it can be accessed by first clicking on one of the WWP or seller entity names listed under the section labeled "WWP/Sellers Customers Reduction Existing WUG

Supplies" and then clicking on one of the customer entity names listed on the WWP Supply Reduction page.

- **WWP/Seller whose Customers will Reduce/Transfer Existing Supplies**- Name and attribute information related to the WWP or seller whose customers will reduce their sold existing supplies by source. Not editable.

- **Total WWP/Seller Volume Increase**-The total increase in the WWP or seller's volume-in as a result of their WWP customers reducing their supply by decade in acre-feet and transferring it back to the WWP or seller. Calculated. Not editable.

- **Total WWP/Seller Volume Increase by Source**- The total increase by source in the WWP or seller's volume-in as a result of their WWP customers reducing their supply by decade in acre-feet and transferring it back to the WWP or seller. Calculated. Not editable.

- **Customer of WWP/Seller that will Reduce/Transfer Existing Supplies**-Name and attribute information related to the WWP or seller customer that may reduce their sold existing supplies by source. Not editable.

- **Customer of WWP/Seller that will Reduce/Transfer Existing Supplies (checkbox)**- By unchecking the checkbox it indicates that the customer as a whole will not be reducing any of its existing WUG supplies. This checkbox will uncheck all of the WUG customers related sources and splits. In order to uncheck this checkbox all related values must be NULL or blank. Editable.

- **Total WWP/Seller Customer Supply Reductions**-Total existing WUG supply volume being reduced by customer by decade in acre feet. Calculated. Not editable.

- **WUG Customer Reducing Existing WUG Supplies Attribute Information**- Information describing the whole WUG entity customer whose WUG splits will be reducing their existing supply on one or more sources. Not editable.

- **WUG Customer Reducing Existing WUG Supplies: Total Whole WUG Supply**- Whole WUG entity customer's aggregated existing supplies by decade, in acre-feet that is entered in the Entity WUG Supply page of the Entity module sold to the WUG by the WMS related WWP or seller. Calculated. Not editable.

- **WUG Customer Reducing Existing WUG Supplies: Total Supply Reduction**- Whole WUG entity customer's aggregated existing supplies by decade, in acre-feet being reduced by the WUG customer entity. Calculated. Not editable.

- **WUG Customer Supply Reduction Source** – Each source is listed that was used as WUG existing supplies in the Entity WUG Supply page of the Entity module that was sold to the WUG by the WMS WWP/Seller. Not editable. See section 3.5 for a list of source attribute descriptions.

- **Existing Supply: Source Total** – Whole WUG entity customer's aggregated existing supplies by decade, in acre-feet by source sold by the WMS related WWP or seller

that is entered in the Entity WUG Supply page of the Entity module. Calculated. Not editable.

- **Existing Supply: Split WUG Total** – Split WUG customer's aggregated existing supplies by decade, in acre-feet by source sold by the WMS related WWP or seller that is entered in the Entity WUG Supply page of the Entity module. Calculated. Not editable.

- **Supply Reduction: Total by Whole WUG/Source**- Total water volume by decade in acre-feet that the whole WUG entity plans to reduce their WUG supplies by source and transfer back to the WMS related WWP or Seller. Editable.

- **Supply Reduction: Total by Whole WUG/Source (Checkbox)** - By unchecking this checkbox, the user is saying that the whole WUG customer entity related to the WMS/Source combination will not be reducing its existing WUG Supply. Unchecking this checkbox will result in the unchecking of all of its related WUG geographic splits. All of the whole WUG and split WUG values related to the WMS/Source combination must be NULL or blank in order for the checkbox to be unchecked. Editable.

- **Supply Reduction: Split WUG Total by Source**- Calculated sum by decade in acre-feet of all split WUG entities that plan to reduce their WUG supplies by source and transfer back to the WMS related WWP or Seller. Decadal volumes must equal the total volume entered for the whole WUG entity. If the water volumes do not match in any decade, the cells will highlight red. Calculated. Not editable. Calculated. Not editable.

- **Supply Reduction: Split WUG by Source**- Total water volume by decade in acre-feet that the split WUG entity plans to reduce their WUG supplies by source and transfer back to the WMS related WWP or Seller. Split WUG supply reduced by source may not exceed the total existing WUG supply by source for the split WUG entity. If existing WUG supply volumes are exceeded in any decade, the values will highlight red. Editable.

- **Supply Reduction: Split WUG by Source (Checkbox)**- By unchecking this checkbox, the user is saying that the split WUG customer entity related to the WMS/Source combination will not be reducing its existing WUG Supply. All of the split WUG values related to the WMS/Source combination must be NULL or blank in order for the checkbox to be unchecked. Editable.

5.7.2.4 Description of Existing Entity Surplus Data Fields

This application page will only be accessible when a WMS Source Use Type is "Existing Entity Surplus." When the WMS Source Use Type is "Existing Entity Surplus," it can be accessed when the user clicks on the related entity's hyperlinked name under the section labeled "Entities Transferring Volume-In Water Volumes."

- **Entity/Source Combination (Checkbox)** - When an Entity WMS with a WMS Source Use Type of "Existing Entity Surplus" is created, this application page will list all sources that the entity receives as either Direct Source Volume-In or Purchased Volume-In. Sources that will be transferred to WUGs through this type of strategy will need to remain checked. If a source will not be transferred, the source should be unchecked, so that it will not display in the WMS WUG supply page. Editable.

- **Entity Source Calculated Surplus Decadal Volumes**- Calculated available entity surplus or unallocated water volumes will be displayed beneath each source's name. The calculated volume is based on volume used as WUG supply or transferred to another entity through the Entity Module's Entity Sales page deducted from volume-in (direct source and/or purchased).

5.7.3   Description of WMS WUG Supply Data Entry Fields

- **WMS Name-** See section 5.7.1 or 5.7.2 for description. Not editable.
- **WMS Sponsor Region-** See section 5.7.1 or 5.7.2 for description. Not editable.
- **WMS Type-** See section 5.7.1 or 5.7.2 for description. Not editable.
- **WMS Source Use Type-** See section 5.7.1 or 5.7.2 for description. Not editable.
- **WMS Id-** See section 5.7.1 or 5.7.2 for description. Not editable.
- **WMS Total Direct Source WUG Supply-** Aggregated total WMS water volume by decade in acre-feet that the whole entity WUG receives through direct access. Calculated. Not editable.
- **WMS Total Purchased WUG Supply-** Aggregated total WMS water volume by decade in acre-feet that the whole entity WUG receives through purchase or transfer. Calculated. Not editable.
- **WMS Entity Name (If Entity WMS)** - If the related WMS has a WMS type of entity, this is the entity originally providing the water through a demand reduction, WUG supply reduction, WWP supply reduction, or existing entity surplus transfer. Not editable.
- **WMS Recommendation Type**- Drop-down list that includes the values "recommended" or "alternative." When the value "recommended" is chosen, it is implied that the water management strategy is a recommended strategy for the WUG in the 2017 State Water Plan. When the value "alternative" is chosen, it is implied that the water management strategy is an "alternative" strategy for the WUG in the 2017 State Water Plan. Editable
- **WMS Description –** The WMS description is a "type" that is applied to the WMS water volume received by the WUG for each related strategy. For a complete list of WMS Descriptions and how they relate to the WMS Source Use type, see Appendix N.

- **Treated Water?-** Drop-down list that includes the values "Yes" or "No". If "Yes" is selected, it is implied that the WMS water volume received by the entity is treated. If "No" is selected, it is implied that the WMS water volume received by the entity is raw water. Editable.
- **New Water Right Required?-** Drop-down list that includes the values "Yes" or "No". If "Yes" is selected, it is implied that the WMS water volume received by the entity requires a new water right. If "No" is selected, it is implied that the WMS water volume received by the entity does not require a new water right. Editable.
- **Unit Costs-** The WUG's annual cost per acre-foot by decade. Costs include may include the following: operations, power cost, purchased water, and debt service. Editable.
- **Remaining WMS Source Water Volume-** Calculated remaining volume that is based on the WMS Source Use Type chosen.
    - Availability Increase- Calculated remaining WMS water volume available to use is the future availability water volume by decade entered for the water management strategies source after the WMS Supply from other recommended WUG's using the WMS source have been deducted. If the WMS source's available water volume is exceeded in any decade, the calculated volume remaining will display as a negative number.
    - Existing Availability- Calculated remaining WMS water volume available to use is the total availability water volume by decade entered in the Source module after all Entity Module Direct Source Volume-In and WMS Supply from other recommended WUG's using the WMS source have been deducted. If the WMS source's available water volume is exceeded in any decade, the calculated volume remaining will display as a negative number.
    - Entity Existing Surplus- Calculated remaining WMS water volume available to use is the Volume-In remaining from the WMS source by decade (Direct Source Volume-In + All Purchased Volume-In) after WUG Supplies, Entity Sales, and other recommended WUG's using the WMS entity/source entity surplus have been deducted. If the WMS Entity/Source combination available entity surplus water volume is exceeded in any decade, the calculated volume remaining will display as a negative number.
    - Demand Reduction Transfer-Calculated remaining WMS water volume available to use is the whole WUG total demand reduced by source after other recommended WUG's using the WMS

entity/source demand reduction transfer have been deducted. If the WMS Entity/Source combination available demand reduction transfer water volume is exceeded in any decade, the calculated volume remaining will display as a negative number.

- o WUG Supply Reduction- Calculated remaining WMS water volume available to use is the whole WUG total WUG supply being reduced by source after other recommended WUG's using the WMS entity/source WUG supply reduced have been deducted. If the WMS Entity/Source combination available WUG supply reduction total is exceeded in any decade, the calculated volume remaining will display as a negative number.

- o WWP or Seller Customer WUG Supply Reduction- Calculated remaining WMS water volume available to use is the related WWP or Seller total customer WUG supply being reduced by source after other recommended WUG's using the WMS entity/source WUG supply reduced have been deducted. If the WMS Entity/Source combination available WUG supply reduction total is exceeded in any decade, the calculated volume remaining will display as a negative number.

- **Whole entity WMS WUG supply (checkbox) -** By unchecking this checkbox, the user is saying that the whole entity related to the WMS/Source or WMS/Entity/Source combination will not be using it as WMS WUG Supply. Unchecking this checkbox will result in the unchecking of all of its related WUG geographic splits. All of the whole WUG and split WUG values related to the WMS/Source or WMS/Entity/Source combination must be NULL or blank in order for the checkbox to be unchecked. Editable.

- **Direct Source Whole WUG Supply-** Annual WMS supply volume from each WMS/Source or WMS/Source/Entity combination directly accessed and used to meet each whole entity's internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.

- **Purchased Source Whole WUG Supply-** Annual WMS supply volume from each WMS/Source or WMS/Source/Entity combination purchased and used to meet each whole entity's internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.

- **WMS Split WUG Total-** Calculated field displaying the sum of all of the Entity's WUG geographic splits for the WMS/Source or WMS/Entity/Source combination. If this sum does not equal the volume entered at the whole entity level for any decade, the volumes will highlight red. Not editable.

- **Split entity WMS WUG supply (Checkbox) -** By unchecking this checkbox, the user is saying that the WUG split entity related to the WMS/Source or WMS/Entity/Source combination will not be using it as WMS WUG Supply. All of the split WUG values related to the WMS/Source or WMS/Entity/Source combination must be NULL or blank in order for the checkbox to be unchecked. Editable.
- **Direct Source Split WUG Supply-** Annual WMS supply volume from each WMS/Source or WMS/Source/Entity combination directly accessed and used to meet each WUG's geographic split(s) internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.
- **Purchased Source Split WUG Supply-** Annual WMS supply volume from each WMS/Source or WMS/Source/Entity combination purchased and used to meet each WUG's geographic split(s) internal WUG demands for decades 2020-2070 where the volume is limited by the most restrictive factor. Editable.
- **WUG Transaction Project Name-** See section 5.7.5 for description. Not Editable.
- **WUG Transaction Project Sponsor Region-** See section 5.7.5 for description. Not Editable.
- **WUG Transaction Project Recommendation Type-** When a project is related to a WMS WUG Transaction, the user must select a WMS Project status of "recommended" or "alternative". Editable.
- **WUG Transaction Project Tier-** When more than one project is related to a WMS WUG Transaction, a project tier value will be required to identify the order in which the related projects must be implemented. If two projects are on the same tier, you may enter the same number twice. If all projects must be implemented at the same time, they will all receive a value of "1". Editable.
- **Project Summary Report-** Report hyperlink that provides a summary of project related data which includes all associated water management strategies and WMS WUG transactions.
- **Project Id-** See section 5.7.5 for description. Not Editable.
- **Project Sponsor Name** See section 5.7.5 for description. Not Editable.
- **Project Sponsor Region-** See section 5.7.5 for description. Not Editable.
- **Capital Cost-** See section 5.7.5 for description. Not Editable.
- **Term of Debt Service-** See section 5.7.5 for description. Not Editable.
- **First Year Funding Required-** See section 5.7.5 for description. Not Editable.
- **Project Component Type-** See section 5.7.5 for description. Not Editable.

5.7.4 Description of WMS Group Data Entry Fields

- **WMS Group Name**- Name given to the group that will relate multiple strategies that must be implemented together. WMS Group name has a maximum length of 100 characters. Editable.

- **WMS Group Sponsor Region** – Sponsor Region given to WMS Group. Only users with access to the WMS Group sponsor region will be able to edit WMS Group details. Editable.

- **WMS Group Comments**- An editable field that is optional for providing additional comments from the planning groups pertaining to the WMS Group. Editable.

- **WMS Group Related Water Management Strategies –** One or more water management strategies that are related to a WMS group. A WMS can be related to a WMS group through the WMS Group Details page or the WMS Details page.

5.7.5 Description of Project Data Entry Fields

- **Project Name**- Unique name of the project that can be a maximum of 100 characters in length. Editable.

- **Project Sponsor Region**- Sponsor Region given to Project. Only users with access to the project sponsor region will be able to edit project details. Editable.

- **Online Date**- Decade the project will be fully operational. Editable.

- **Latitude**- Representation of a project centroid latitudinal point. Editable.

- **Longitude**- Representation of a project centroid longitudinal point. Editable.

- **Project Comments**- An editable field that is optional for providing additional comments from the planning groups pertaining to the project. Editable.

- **Related Project Sponsors: Entity Name**- Name of entity who will be sponsoring the project and acquiring funding if capital cost if required. Project sponsors can be selected from a list of all entities regardless of type. Editable.

- **Related Project Sponsors: Entity Primary Region**- Region related to the entity sponsoring the project. Not editable.

- **Related Project Sponsors: Capital Cost**- Capital cost required to implement project. Capital costs are provided by related sponsor. Capital costs may include the following: construction, design, legal/easements, environmental studies, interest during construction, and purchased water. Editable.

- **Related Project Sponsors: Term of Debt Service**- Estimated length or term of the debt service. Editable.

- **Related Project Sponsors: First Year Funding Date Required**- Estimated year when funding will be required for the project. Editable.

- **Related Project Sponsors: Comments-** An editable field that is optional for providing additional comments from the planning groups pertaining to the project sponsor. Editable.

- **Related Components: Component Name-** Chosen from pop-up list containing all the specified component types. See Appendix Z for list. Editable.

- **Related Components: Component Comments-** An editable field that is optional for providing additional comments from the planning groups pertaining to the project component. Editable.

Appendix A: Acronym Definitions

The following is a list of definitions for common acronyms used throughout this document:

- TWDB – Texas Water Development Board

- DB17 – The 2017 Regional Water Planning Application

- RWPG – Regional Water Planning Group

- RWP – Regional Water Plan

- RWPA – Regional Water Planning Area

- WUG – Water User Group

- WWP – Wholesale Water Provider

- WMS – Water Management Strategy

- DB07 – The 2007 Regional Water Planning Application

- DB12 – The 2012 Regional Water Planning Application

Appendix B: Geographic Information Data Requirements Checklist

The following checklists may be used to assist in complying with data requirements for geographic information listed in Section 2.3:

- Data

  - ☐ Is each vector file, CAD included, in geographic, decimal degrees, NAD83 or appropriate, specified projection?
  - ☐ Is each raster file in its native projection?
  - ☐ Is each data file one of the TWDB acceptable formats?
  - ☐ Does each data file have metadata in an associated file?
  - ☐ Are the primary and foreign keys documented for tabular data?
  - ☐ Is a README text file included with a directory structure explaining how the structure is organized?

- Maps

  - ☐ Is each static map provided in an electronic format at a resolution of 300 dpi or higher?
  - ☐ Does each static map have fonts embedded?
  - ☐ Has the page and print setup for map documents been configured to NOT use printer-specific paper settings?
  - ☐ Are map documents set to use relative paths?
  - ☐ Are map names prefixed with the project name, including the appropriate region?
  - ☐ Are map documents accompanied with their relevant data in a stand-alone directory structure?
  - ☐ Does each map have metadata in an associated file?

Appendix C: DB17 Sources Module Data Field Matrix

The following matrix lists the data fields in the Source Module, the various source types and sub types and whether the field is visible, editable and required in the DB17 application. 'Y' equals 'Yes,' 'N' equals 'No' and 'C' equals 'Conditional.' If a row and column have a 'C' listed, please refer to the footnotes below the table.

	Label	Groundwater: MAG			Groundwater: Non-MAG (With MAG Availability)		
		Visible	Editable	Required	Visible	Editable	Required
1	SourceId:	Y	N	N	Y	N	N
2	DbSoId:	Y	N	N	Y	N	N
3	Source Name:	Y	N	N	Y	N	N
4	Source Details:	Y	N	N	Y	N	N
5	Source Region:	Y	N	N	Y	N	N
6	Source County:	Y	N	N	Y	N	N
7	Source Basin:	Y	N	N	Y	N	N
8	Source Type:	Y	N	N	Y	N	N
9	Source Sub Type:	Y	N	N	Y	N	N
10	Is this an existing or future source?:	Y	N	N	Y	N	N
11	Is this source generally considered brackish or saline?:	Y	Y	Y	Y	Y	Y
12	Was Total Availability of the source reduced due to water quality considerations?:	Y	Y	Y	Y	Y	Y
13	Methodology used to determine availability volumes:	Y	Y	Y	Y	Y	Y
14	Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below:	Y	Y	C[1]	Y	Y	C[1]
15	If the source name is 'Other Aquifer' please list the aquifer name. If the aquifer name is unknown, please list 'Unknown':	C[2]	C[2]	C[2]	C[2]	C[2]	C[2]
16	Is Total Availability based on firm yield?:	N	N	N	N	N	N
17	Additional comments about this source:	Y	Y	N	Y	Y	N
18	Decade	Y	N	N	Y	N	N
19	Total Availability	Y	N	N	Y	N	N
20	Firm Yield	N	N	N	N	N	N
21	MAG Availability	Y	N	N	Y	N	N
22	Non-MAG Availability	N	N	N	Y	Y	Y
23	Additional comments about availability, including, if applicable, any comments about firm yield or MAG volumes:	Y	Y	N	Y	Y	N

24	System Name:	N	N	N	N	N	N
25	Reservoir Name:	N	N	N	N	N	N
26	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)?:	N	N	N	N	N	N
27	What is the original conservation pool of this reservoir or reservoir component of this system?:	N	N	N	N	N	N
28	Additional comments about this reservoir or reservoir component of this system:	N	N	N	N	N	N
29	Decade	N	N	N	N	N	N
30	Source System Availability: Firm Yield	N	N	N	N	N	N

[1]This field is required when certain values are selected from the **Methodology used to determine availability volumes** field. Please refer to Appendix # for further details.

[2]This field is visible, editable and required only when the **Source Name** is 'Other Aquifer.'

[3]This field is visible, editable and required only when **Is Total Availability based on firm yield?** equals 'N.'

	Label	Groundwater: Non-MAG (Without MAG Availability)			Surface Water: Local Supply		
		Visible	Editable	Required	Visible	Editable	Required
1	SourceId:	Y	N	N	Y	N	N
2	DbSoId:	Y	N	N	Y	N	N
3	Source Name:	Y	N	N	Y	N	N
4	Source Details:	Y	N	N	Y	N	N
5	Source Region:	Y	N	N	Y	N	N
6	Source County:	Y	N	N	Y	N	N
7	Source Basin:	Y	N	N	Y	N	N
8	Source Type:	Y	N	N	Y	N	N
9	Source Sub Type:	Y	N	N	Y	N	N
10	Is this an existing or future source?:	Y	N	N	Y	N	N
11	Is this source generally considered brackish or saline?:	Y	Y	Y	Y	Y	Y
12	Was Total Availability of the source reduced due to water quality considerations?:	Y	Y	Y	Y	Y	Y
13	Methodology used to determine availability volumes:	Y	Y	Y	Y	Y	Y
14	Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below:	Y	Y	C[1]	Y	Y	C[1]
15	If the source name is 'Other Aquifer' please list the aquifer name. If the aquifer name is	C[2]	C[2]	C[2]	N	N	N

	unknown, please list 'Unknown':						
16	Is Total Availability based on firm yield?:	N	N	N	N	N	N
17	Additional comments about this source:	Y	Y	N	Y	Y	N
18	Decade	Y	N	N	Y	N	N
19	Total Availability	Y	Y	Y	Y	Y	Y
20	Firm Yield	N	N	N	N	N	N
21	MAG Availability	N	N	N	N	N	N
22	Non-MAG Availability	N	N	N	N	N	N
23	Additional comments about availability, including, if applicable, any comments about firm yield or MAG volumes:	Y	Y	N	Y	Y	N
24	System Name:	N	N	N	N	N	N
25	Reservoir Name:	N	N	N	N	N	N
26	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)?:	N	N	N	N	N	N
27	What is the original conservation pool of this reservoir or reservoir component of this system?:	N	N	N	N	N	N
28	Additional comments about this reservoir or reservoir component of this system:	N	N	N	N	N	N
29	Decade	N	N	N	N	N	N
30	Source System Availability: Firm Yield	N	N	N	N	N	N

[1]This field is required when certain values are selected from the **Methodology used to determine availability volumes** field. Please refer to Appendix # for further details.

[2]This field is visible, editable and required only when the **Source Name** is 'Other Aquifer.'

[3]This field is visible, editable and required only when **Is Total Availability based on firm yield?** equals 'N.'

	Label	Surface Water: Run-of-River			Surface Water: Reservoir		
		Visible	Editable	Required	Visible	Editable	Required
1	SourceId:	Y	N	N	Y	N	N
2	DbSoId:	Y	N	N	Y	N	N
3	Source Name:	Y	N	N	Y	N	N
4	Source Details:	Y	N	N	Y	N	N
5	Source Region:	Y	N	N	Y	N	N
6	Source County:	Y	N	N	Y	N	N

7	Source Basin:	Y	N	N	Y	N	N
8	Source Type:	Y	N	N	Y	N	N
9	Source Sub Type:	Y	N	N	Y	N	N
10	Is this an existing or future source?:	Y	N	N	Y	N	N
11	Is this source generally considered brackish or saline?:	Y	Y	Y	Y	Y	Y
12	Was Total Availability of the source reduced due to water quality considerations?:	Y	Y	Y	Y	Y	Y
13	Methodology used to determine availability volumes:	Y	Y	Y	Y	Y	Y
14	Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below:	Y	Y	C[1]	Y	Y	C[1]
15	If the source name is 'Other Aquifer' please list the aquifer name. If the aquifer name is unknown, please list 'Unknown':	N	N	N	N	N	N
16	Is Total Availability based on firm yield?:	N	N	N	Y	Y	Y
17	Additional comments about this source:	Y	Y	N	Y	Y	N
18	Decade	Y	N	N	Y	N	N
19	Total Availability	Y	Y	Y	Y	Y	Y
20	Firm Yield	N	N	N	C[3]	C[3]	C[3]
21	MAG Availability	N	N	N	N	N	N
22	Non-MAG Availability	N	N	N	N	N	N
23	Additional comments about availability, including, if applicable, any comments about firm yield or MAG volumes:	Y	Y	N	Y	Y	N
24	System Name:	N	N	N	Y	N	N
25	Reservoir Name:	N	N	N	Y	N	N
26	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)?:	N	N	N	Y	Y	Y
27	What is the original conservation pool of this reservoir or reservoir component of this system?:	N	N	N	Y	Y	Y
28	Additional comments about this reservoir or reservoir component of this system:	N	N	N	Y	Y	N
29	Decade	N	N	N	N	N	N
30	Source System Availability: Firm Yield	N	N	N	N	N	N

[1]This field is required when certain values are selected from the **Methodology used to determine availability volumes** field. Please refer to Appendix # for further details.

[2]This field is visible, editable and required only when the **Source Name** is 'Other Aquifer.'

[3]This field is visible, editable and required only when **Is Total Availability based on firm yield?** equals 'N.'

	Label	Surface Water: System			Reuse: Direct Reuse		
		Visible	Editable	Required	Visible	Editable	Required
1	SourceId:	Y	N	N	Y	N	N
2	DbSoId:	Y	N	N	Y	N	N
3	Source Name:	Y	N	N	Y	N	N
4	Source Details:	Y	N	N	Y	N	N
5	Source Region:	Y	N	N	Y	N	N
6	Source County:	Y	N	N	Y	N	N
7	Source Basin:	Y	N	N	Y	N	N
8	Source Type:	Y	N	N	Y	N	N
9	Source Sub Type:	Y	N	N	Y	N	N
10	Is this an existing or future source?:	Y	N	N	Y	N	N
11	Is this source generally considered brackish or saline?:	Y	Y	Y	Y	Y	Y
12	Was Total Availability of the source reduced due to water quality considerations?:	Y	Y	Y	Y	Y	Y
13	Methodology used to determine availability volumes:	Y	Y	Y	Y	Y	Y
14	Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below:	Y	Y	C[1]	Y	Y	C[1]
15	If the source name is 'Other Aquifer' please list the aquifer name. If the aquifer name is unknown, please list 'Unknown':	N	N	N	N	N	N
16	Is Total Availability based on firm yield?:	Y	Y	Y	N	N	N
17	Additional comments about this source:	Y	Y	N	Y	Y	N
18	Decade	Y	N	N	Y	N	N
19	Total Availability	Y	Y	Y	Y	Y	Y
20	Firm Yield	C[3]	C[3]	C[3]	N	N	N
21	MAG Availability	N	N	N	N	N	N
22	Non-MAG Availability	N	N	N	N	N	N
23	Additional comments about availability, including, if applicable, any comments about firm yield or MAG volumes:	Y	Y	N	Y	Y	N
24	System Name:	Y	N	N	N	N	N
25	Reservoir Name:	Y	N	N	N	N	N
26	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)?:	Y	Y	Y	N	N	N
27	What is the original conservation pool of this reservoir or reservoir component of this system?:	Y	Y	Y	N	N	N

28	Additional comments about this reservoir or reservoir component of this system:	Y	Y	N	N	N	N
29	Decade	Y	N	N	N	N	N
30	Source System Availability: Firm Yield	Y	Y	Y	N	N	N

[1]This field is required when certain values are selected from the **Methodology used to determine availability volumes** field. Please refer to Appendix # for further details.

[2]This field is visible, editable and required only when the **Source Name** is 'Other Aquifer.'

[3]This field is visible, editable and required only when **Is Total Availability based on firm yield?** equals 'N.'

	Label	Reuse: Indirect Reuse		
		Visible	**Editable**	**Required**
1	SourceId:	Y	N	N
2	DbSoId:	Y	N	N
3	Source Name:	Y	N	N
4	Source Details:	Y	N	N
5	Source Region:	Y	N	N
6	Source County:	Y	N	N
7	Source Basin:	Y	N	N
8	Source Type:	Y	N	N
9	Source Sub Type:	Y	N	N
10	Is this an existing or future source?:	Y	N	N
11	Is this source generally considered brackish or saline?:	Y	Y	Y
12	Was Total Availability of the source reduced due to water quality considerations?:	Y	Y	Y
13	Methodology used to determine availability volumes:	Y	Y	Y
14	Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below:	Y	Y	C[1]
15	If the source name is 'Other Aquifer' please list the aquifer name. If the aquifer name is unknown, please list 'Unknown':	N	N	N
16	Is Total Availability based on firm yield?:	N	N	N
17	Additional comments about this source:	Y	Y	N
18	Decade	Y	N	N
19	Total Availability	Y	Y	Y
20	Firm Yield	N	N	N
21	MAG Availability	N	N	N

22	Non-MAG Availability	N	N	N
23	Additional comments about availability, including, if applicable, any comments about firm yield or MAG volumes:	Y	Y	N
24	System Name:	N	N	N
25	Reservoir Name:	N	N	N
26	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)?:	N	N	N
27	What is the original conservation pool of this reservoir or reservoir component of this system?:	N	N	N
28	Additional comments about this reservoir or reservoir component of this system:	N	N	N
29	Decade	N	N	N
30	Source System Availability: Firm Yield	N	N	N

[1]This field is required when certain values are selected from the **Methodology used to determine availability volumes** field. Please refer to Appendix # for further details.
[2]This field is visible, editable and required only when the **Source Name** is 'Other Aquifer.'
[3]This field is visible, editable and required only when **Is Total Availability based on firm yield?** equals 'N.'

Appendix D: Source Types and Source Sub Types Matrix

The following matrix lists the source types and their corresponding sub types.

Source Type	Source Sub Type
Surface Water	Run-Of-River
Surface Water	Reservoir
Surface Water	System
Surface Water	Livestock Local Supply
Surface Water	Other Local Supply
Surface Water	Gulf of Mexico
Groundwater	Groundwater
Reuse	Direct Reuse
Reuse	Indirect Reuse

Appendix E: Methodology Used to Determine Total Availability Volumes Matrix

The following matrix lists the available values for the **Methodology used to determine Total Availability volumes** field, what types of sources should be associated with those values, if any additional information is required and the description of the additional information required. Additional information should be listed in the **Based on the requirements listed in the Guidelines for Data Deliverables, please enter related information about the methodology value chosen in the text box below** field in the DB17 application.

Methodology Used to Determine Total Availability Volumes	Source Type & Source Sub Type	Additional Information Required?	Description of Additional Information Required
Modeled Available Groundwater (MAG)	• Groundwater: MAG	N	
Groundwater Availability Model (GAM)	• Groundwater: Non-MAG (With MAG Availability) • Groundwater: Non-MAG (Without MAG Availability)	Y	Specify which model, whose model and the date.
Groundwater Availability Model (GAM) Modified	• Groundwater: Non-MAG (With MAG Availability) • Groundwater: Non-MAG (Without MAG Availability)	Y	Specify which model, whose model, the date, description of modification and EA approval date.

Methodology Used to Determine Total Availability Volumes	Source Type & Source Sub Type	Additional Information Required?	Description of Additional Information Required
Effective Aquifer Recharge	• Groundwater: Non-MAG (With MAG Availability) • Groundwater: Non-MAG (Without MAG Availability)	N	Specify basis of recharge estimates.
Availability Set to Demand	• Groundwater: Non-MAG (With MAG Availability) • Groundwater: Non-MAG (Without MAG Availability) • Surface Water: Livestock Local Supply • Surface Water: Other Local Supply • Reuse: Direct Reuse	N	Specify justification for setting availability equal to demand if demand is less than actual availability during drought of record conditions.

Methodology Used to Determine Total Availability Volumes	Source Type & Source Sub Type	Additional Information Required?	Description of Additional Information Required
Published Reports/Data	• Groundwater: Non-MAG (With MAG Availability) • Groundwater: Non-MAG (Without MAG Availability) • Surface Water: Livestock Local Supply • Surface Water: Other Local Supply	Y	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	N	

Methodology Used to Determine Total Availability Volumes	Source Type & Source Sub Type	Additional Information Required?	Description of Additional Information Required
Permitted Amount	• Groundwater: Non-MAG (With MAG Availability) • Groundwater: Non-MAG (Without MAG Availability) • Reuse: Direct Reuse • Reuse: Indirect Reuse	N	
Diversion Infrastructure Capacity	• Surface Water: Run-of-River • Surface Water: Reservoir • Surface Water: System • Surface Water: Gulf of Mexico • Reuse: Direct Reuse • Reuse: Indirect Reuse	N	

| Methodology Used to Determine Total Availability Volumes	Source Type & Source Sub Type	Additional Information Required?	Description of Additional Information Required
Wastewater Treatment Plant Discharge	• Reuse: Direct Reuse • Reuse: Indirect Reuse	N	
Water Availability Model (WAM) Run 3	• Surface Water: Run-of-River • Surface Water: Reservoir • Surface Water: System	N	
Water Availability Model (WAM) Run 3 Modified	• Surface Water: Run-of-River • Surface Water: Reservoir • Surface Water: System	Y	Specify which model, whose model, the date, description of modification, qualifier, and EA approval date.
Source is Not in Use	• All	N	
Other	• All	Y	Must provide a detailed description of the methodology used. If more than one of the methodologies are identified, any additional information listed previously in this table must also be included.

Appendix F: Entity Types
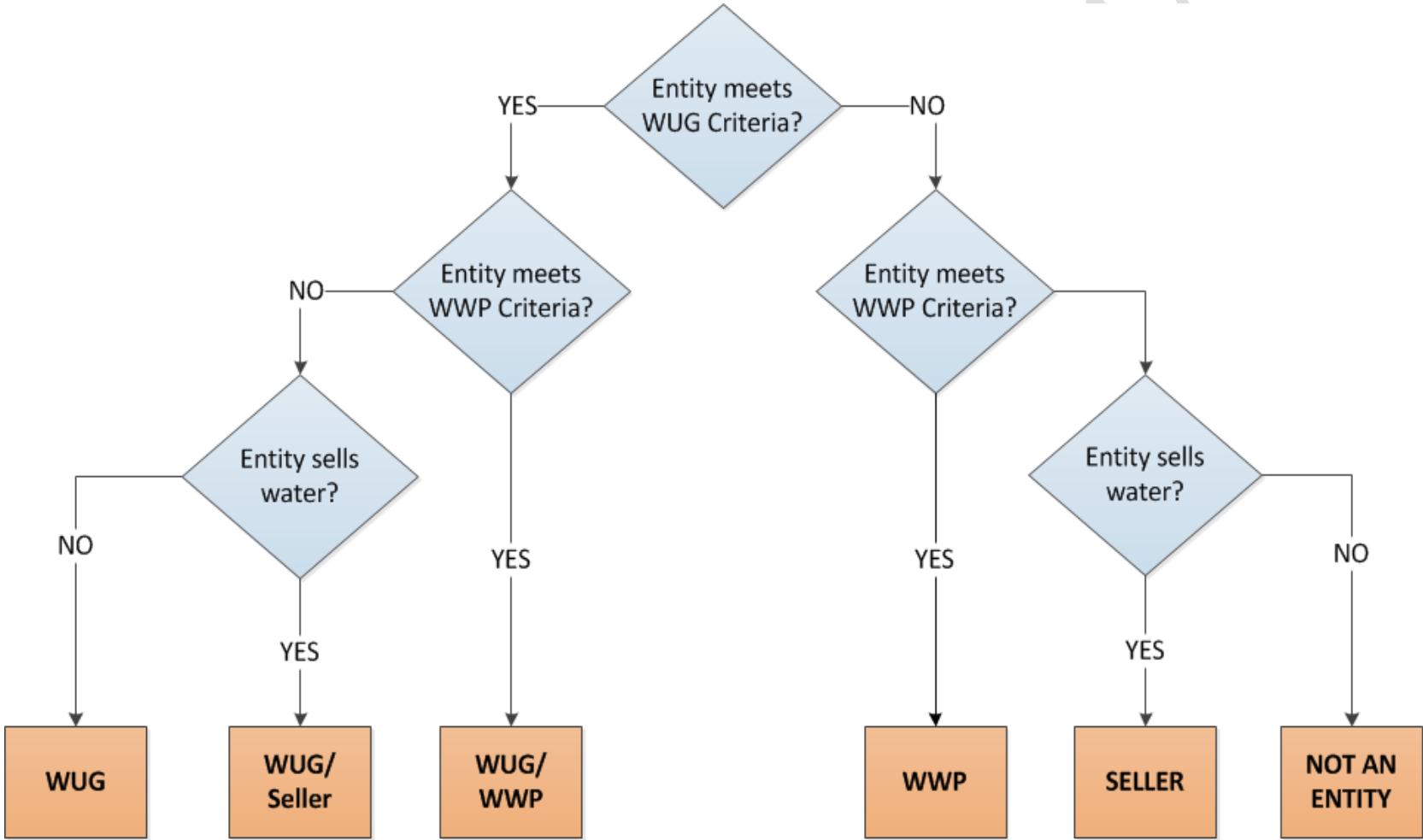
Appendix G: Entity Module Page Visibility by Entity Type

Entity Module Pages	Entity Types				
	WUG	WUG/WWP	WUG/Seller	WWP	Seller
Entity Description	X	X	X	X	X
WUG Projections	X	X	X		
Direct Source Volume-In	X	X	X	X	X
Entity Sales		X	X	X	X
WUG Supply	X	X	X		

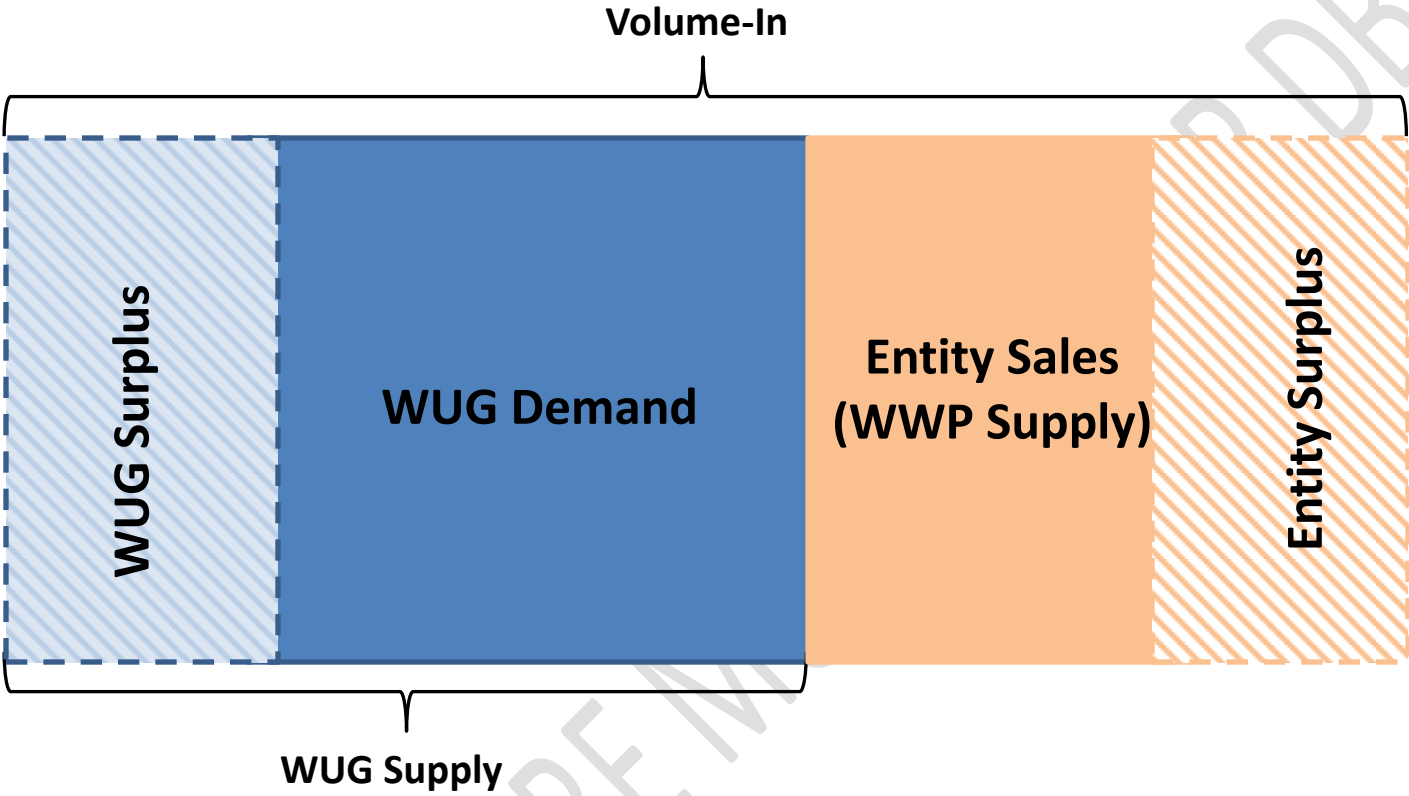**Appendix H: Wholesale/Retail Example**
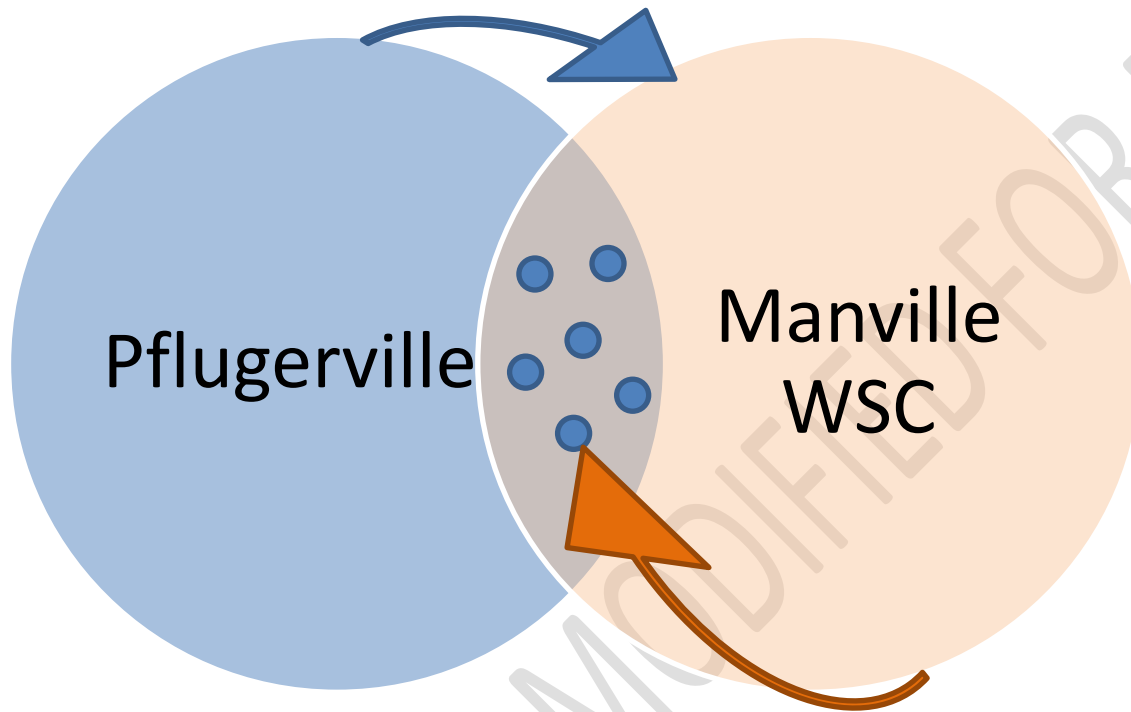
*Pflugerville sells water wholesale to Manville WSC. Manville WSC sells water to individual connections within its service area, located within the entity Pflugerville's population boundary.
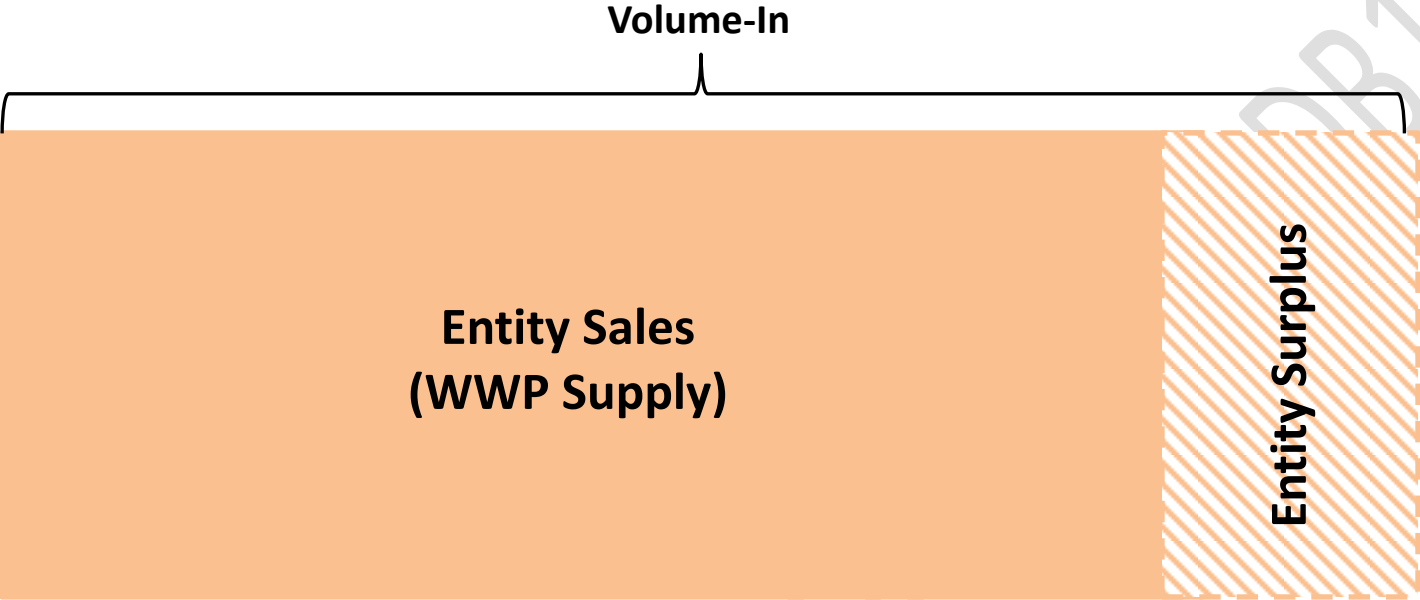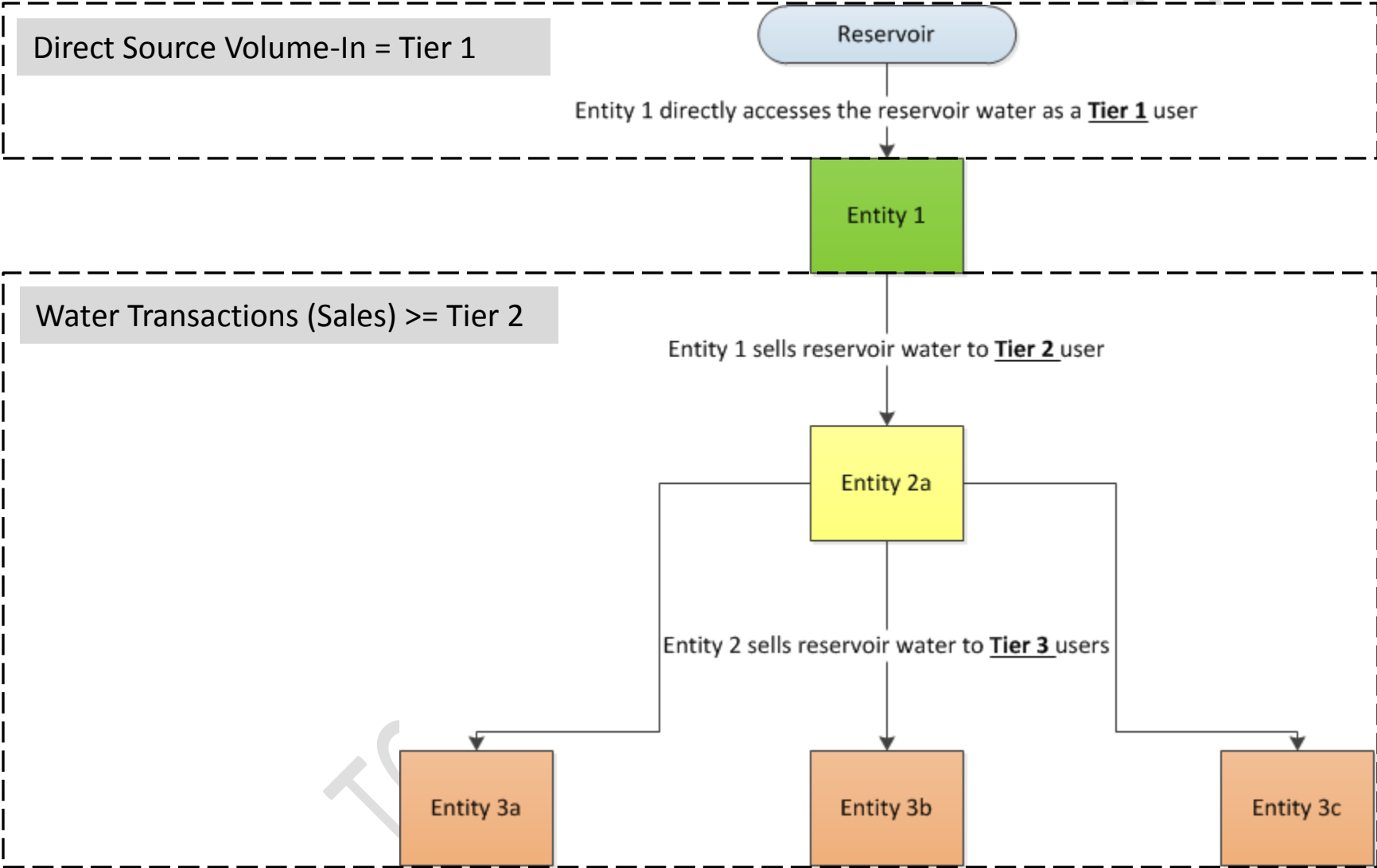
Appendix I: Water Volumes by WUG Entity Type

Volume-In

WUG Surplus

WUG Demand

Entity Surplus

WUG Supply
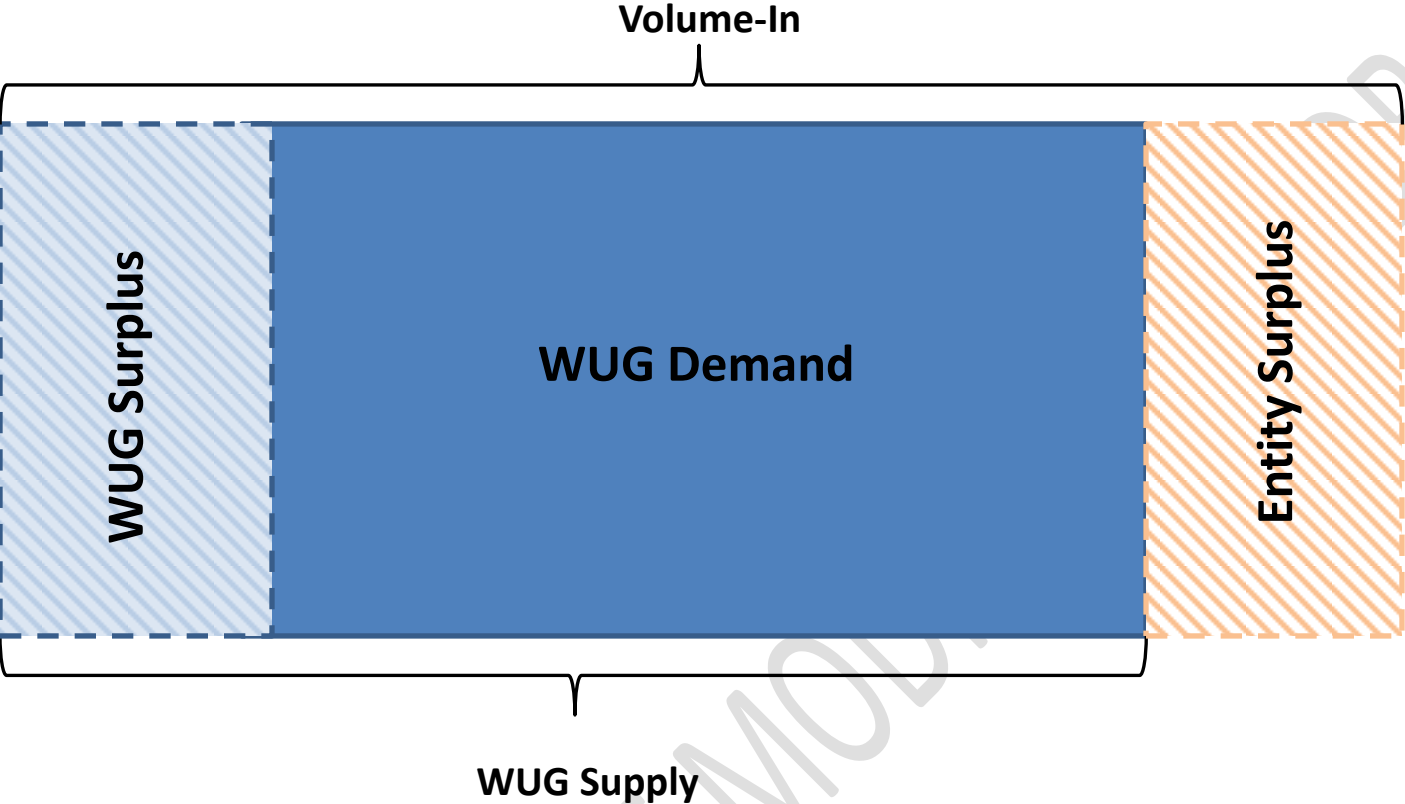
Appendix J: Water Volumes by WUG/WWP or WUG/Seller Entity Types

Volume-In

| WUG Surplus | WUG Demand | Entity Sales (WWP Supply) | Entity Surplus |

WUG Supply

Appendix K: Water Volumes by WWP or Seller Entity Types

Volume-In

Entity Sales
(WWP Supply)

Entity Surplus

Appendix L: Entity Water Volume Tier Structure

Direct Source Volume-In = Tier 1

Reservoir

Entity 1 directly accesses the reservoir water as a **Tier 1** user

Entity 1

Water Transactions (Sales) >= Tier 2

Entity 1 sells reservoir water to **Tier 2** user

Entity 2a

Entity 2 sells reservoir water to **Tier 3** users

Entity 3a

Entity 3b

Entity 3c

Appendix M: Water Management Strategy Diagram

Water Management Strategy (WMS)

A water management strategy is a method in which a WUG accesses future water supply.

Source 1

Source 2

WMS

WMS Level – "above the line"

WMS WUG Level - "below the line"

WUG 1

WUG 2
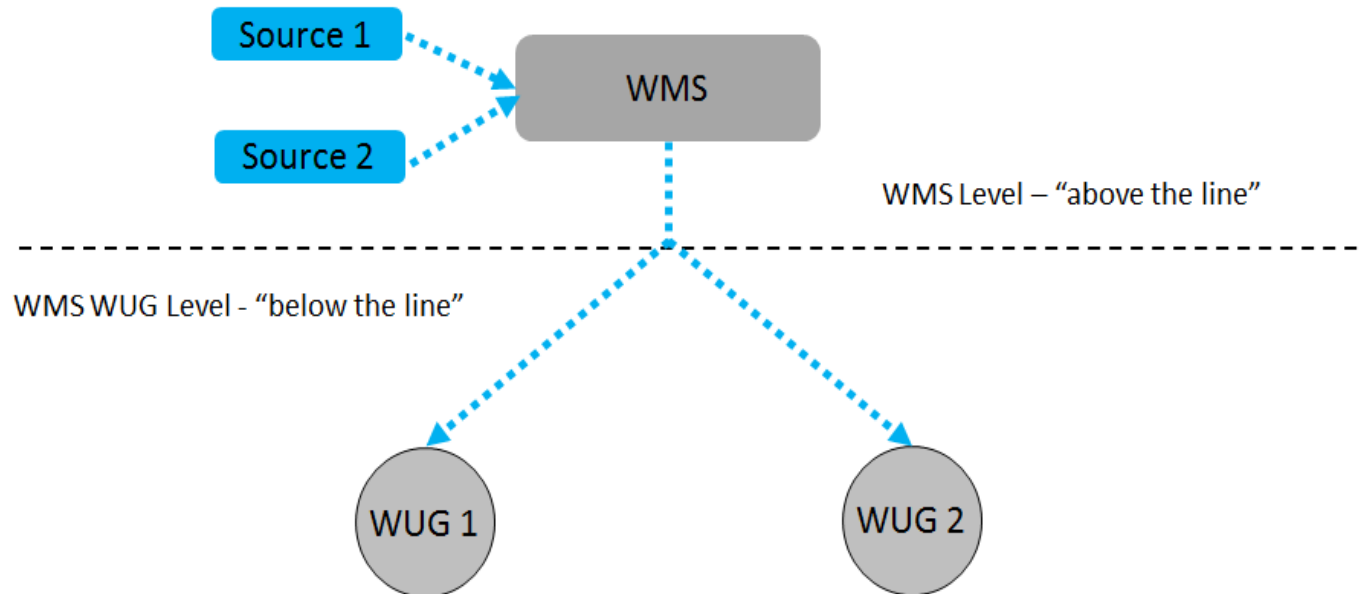
Appendix N: List of Water Management Strategy Descriptions

WMS Source Use Type	Source Water Management Strategies			Entity Water Management Strategies			
	Availability Increase	Availability Decrease	Existing Availability	Existing WUG Supply Reduction	Existing WWP/Seller Customer Supply Reduction	Demand Reduction	Existing Entity Surplus
Surface Water Yield Enhancement	X	X					
Weather Modification	X						
Brush Control	X						
Rainwater Harvesting	X						
Out of State Source	X						
Trucked or Bottled Water	X						
Aquifer Storage & Recovery	X						
New Reservoir	X						
Non-Potable Reuse only - no new Infrastructure	X						
Non-Potable Reuse with Infrastructure	X						
Potable Reuse with Infrastructure	X						
Surface Water Diversion	X		X				
Desalination	X						
Conjunctive Use	X	X	X	X	X	X	X
Groundwater Well Development			X				
Increase Groundwater Pumping Using Existing Wells			X				
New Infrastructure Only			X				X
Water Supply Reduction				X	X		
Conservation Only - no new Infrastructure						X	
Conservation with Infrastructure						X	
Drought Management						X	
Transfer/Transaction only - no new Infrastructure							X
Transfer/Transaction with Infrastructure							X

'X' denotes WMS Description labels that will display when one of the WMS Source Use Types is chosen for a strategy.

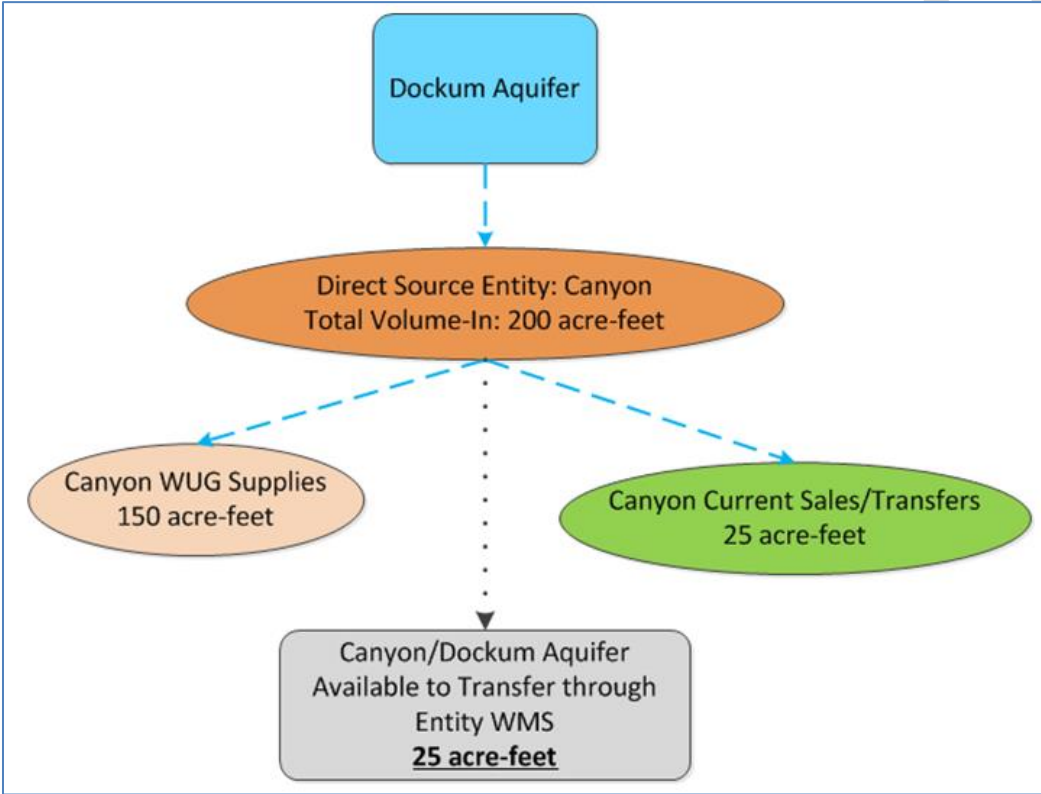## Appendix O - Source WMS, Existing Availability
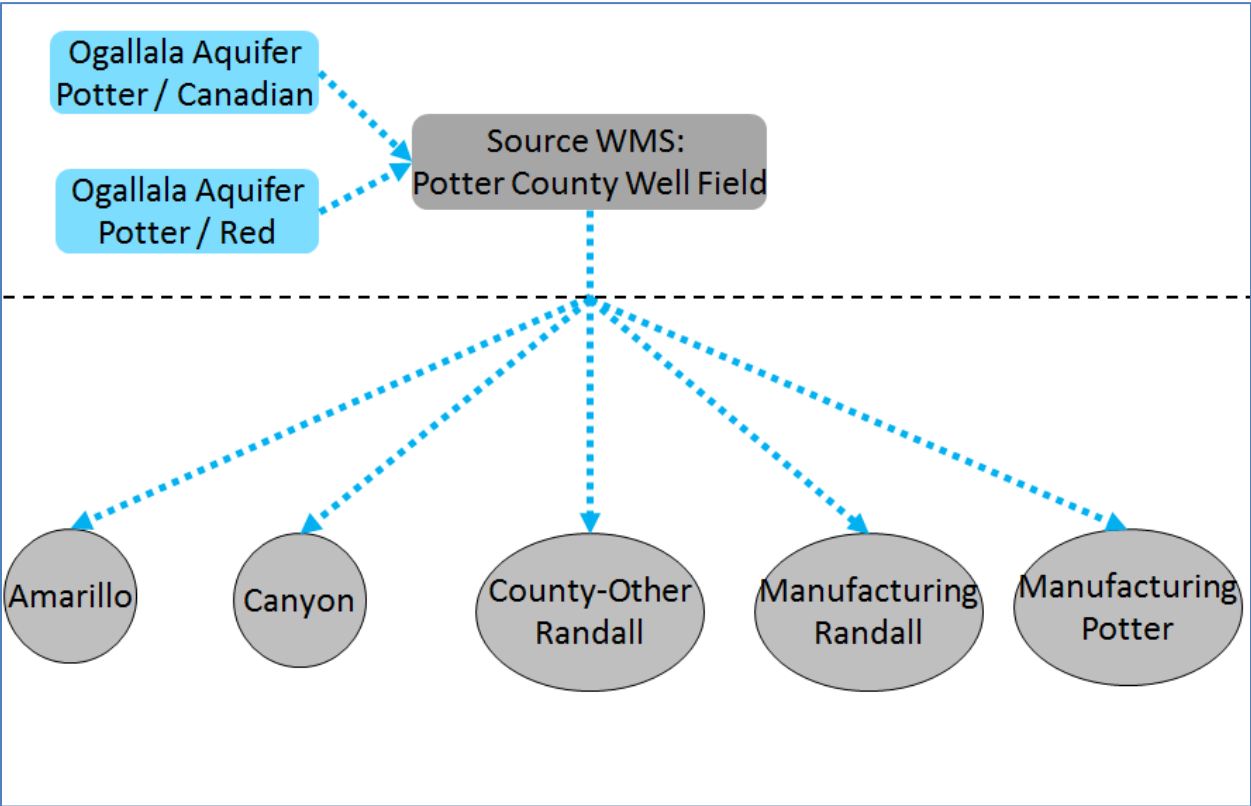
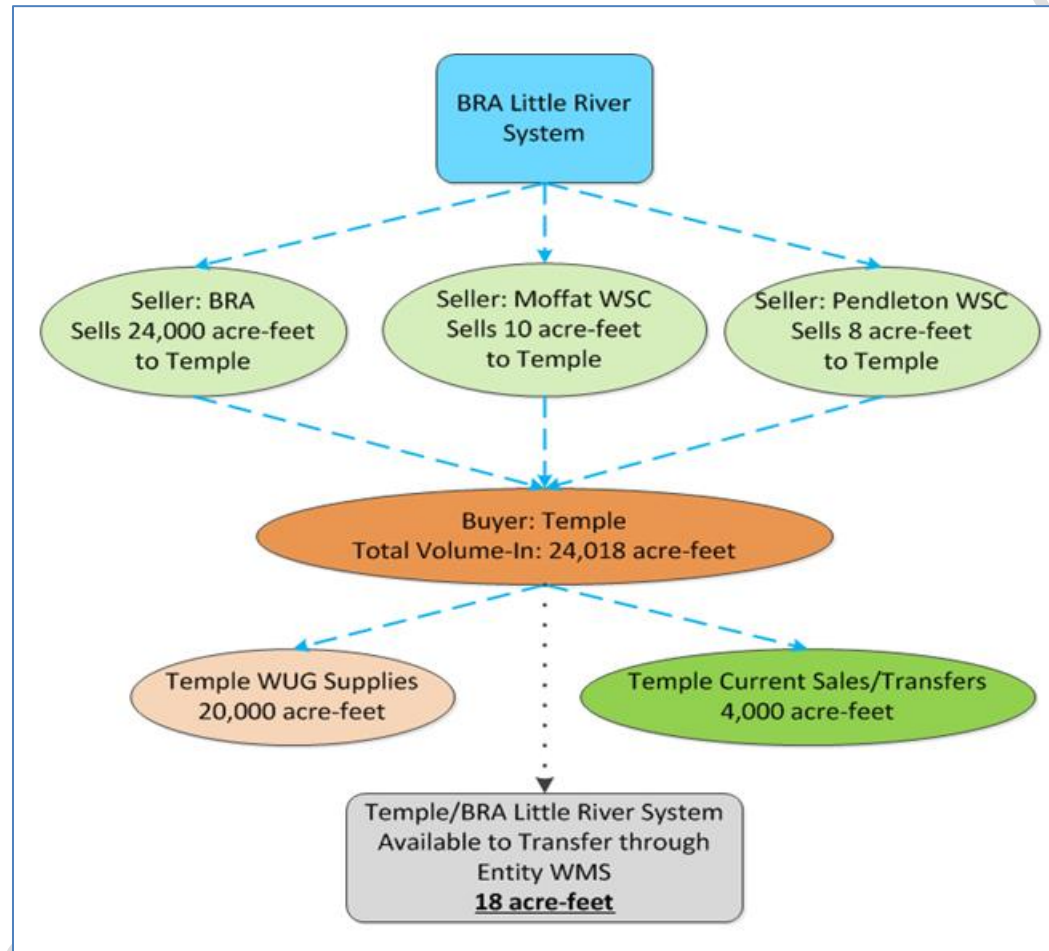## Appendix P - Source WMS, Increase Availability
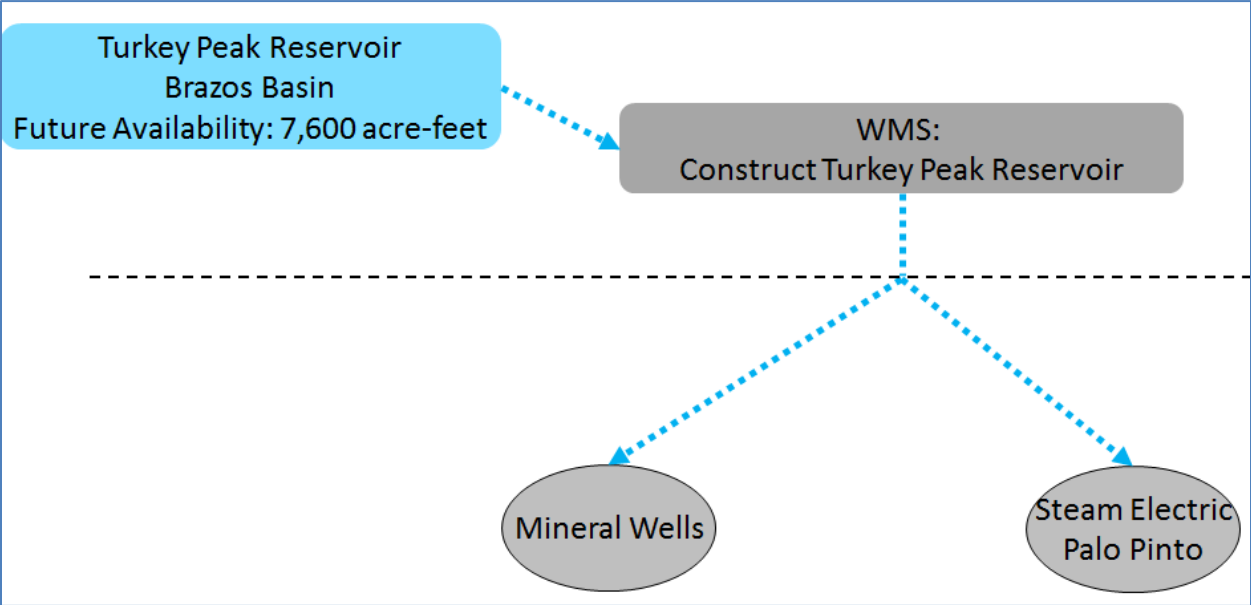
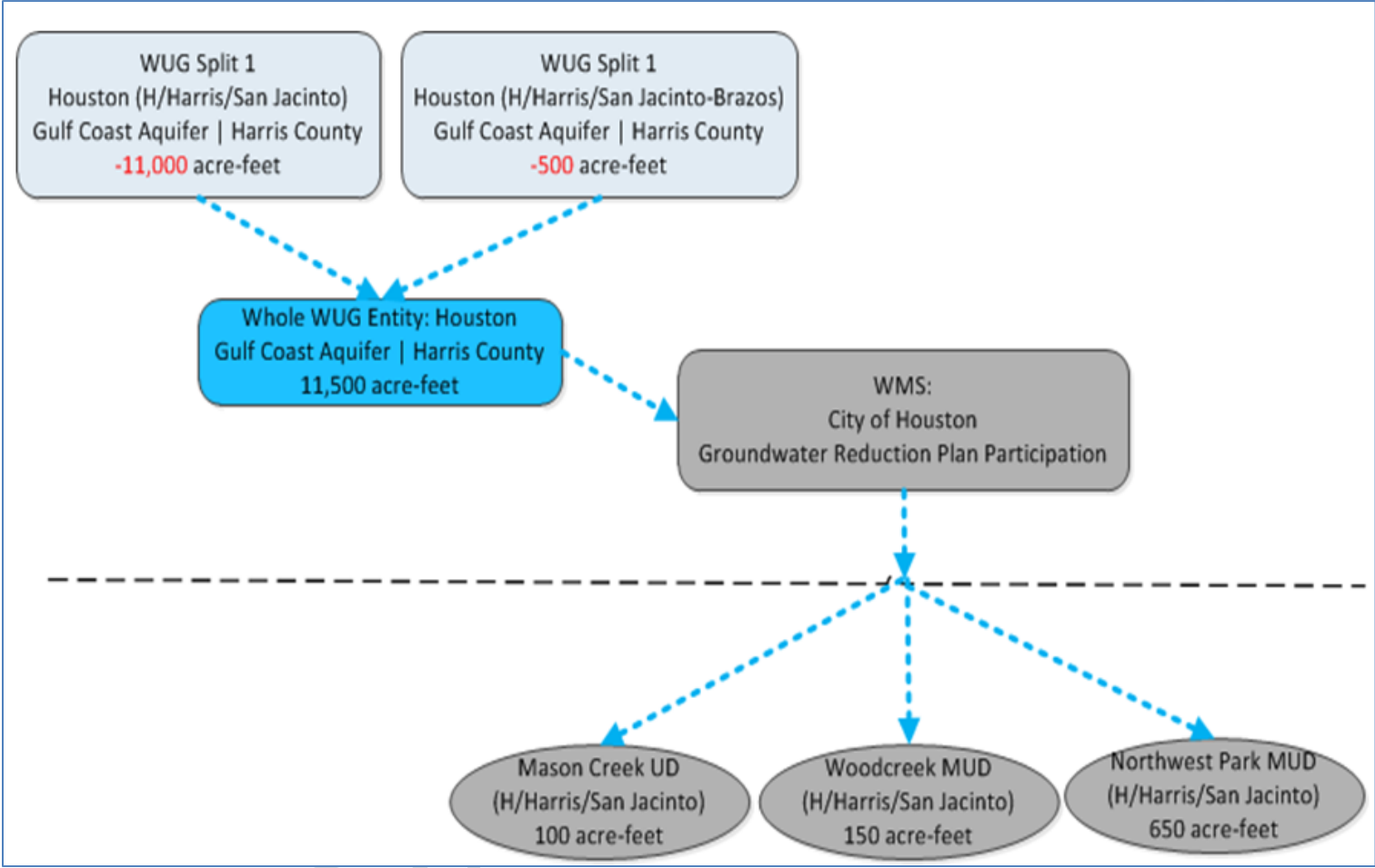## Appendix Q: Entity WMS: Entity Surplus from Direct Source Volume-In

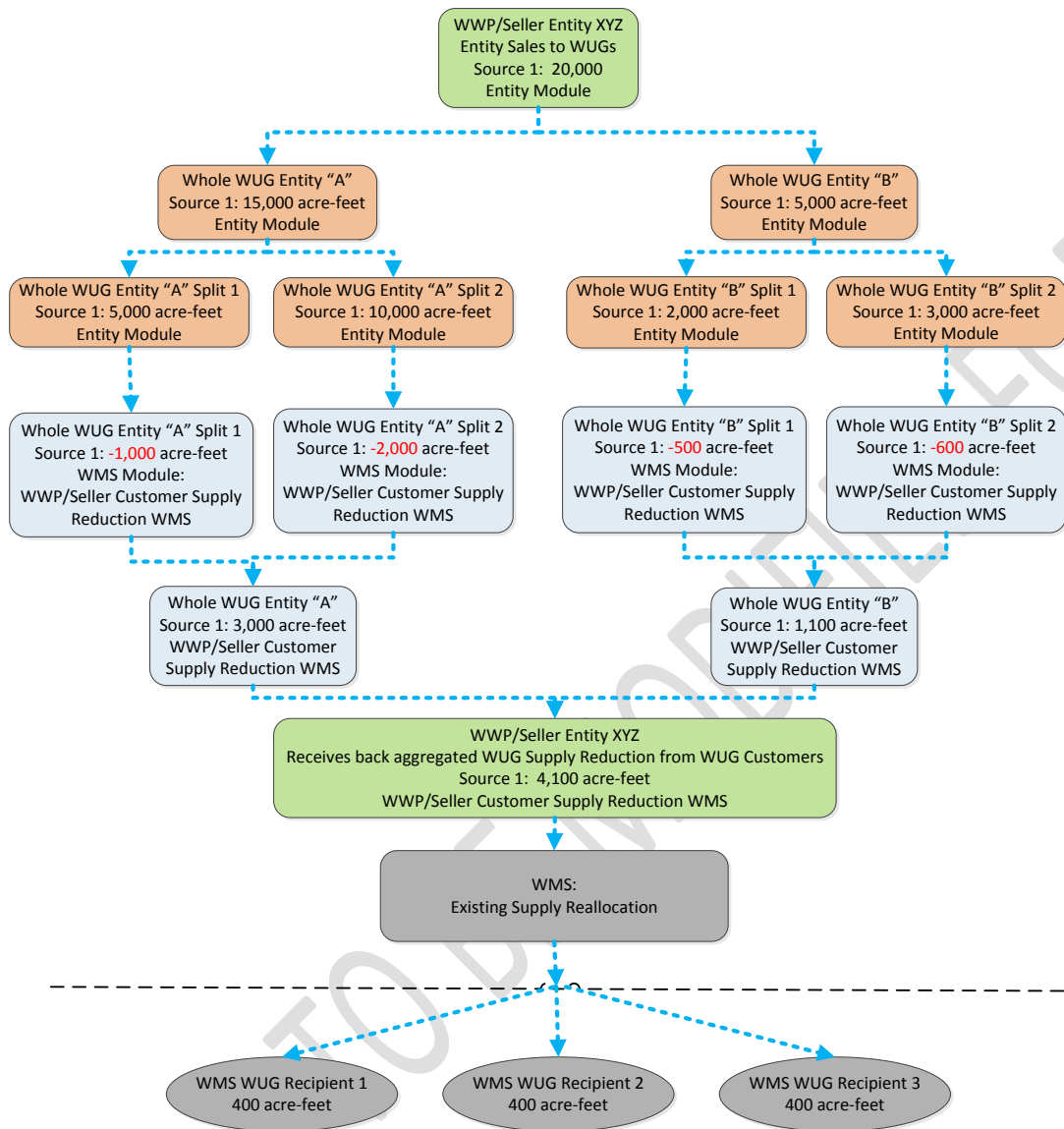## Appendix R: Entity WMS: Entity Surplus from Purchased Volume-In

*In the WMS module it doesn't matter who Temple got the water from, just that they have surplus of the source that can be transferred through a WMS. When a WMS WUG relates to an Entity WMS having Temple as its source, it will just display BRA Little River System and how much left there is to allocate.
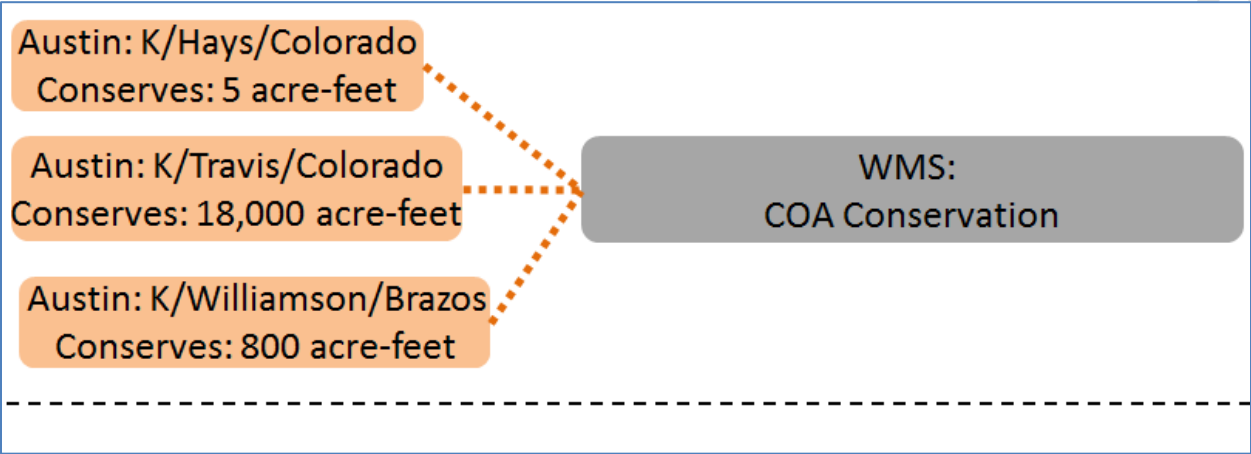
Appendix S - Entity WMS, WUG Supply Reduction

Appendix T - Entity WMS, WUG Supply Reduction

```
                    WWP/Seller Entity XYZ
                    Entity Sales to WUGs
                    Source 1:  20,000
                    Entity Module


    Whole WUG Entity "A"                        Whole WUG Entity "B"
    Source 1: 15,000 acre-feet                  Source 1: 5,000 acre-feet
    Entity Module                               Entity Module


Whole WUG Entity "A" Split 1   Whole WUG Entity "A" Split 2    Whole WUG Entity "B" Split 1   Whole WUG Entity "B" Split 2
Source 1: 5,000 acre-feet      Source 1: 10,000 acre-feet     Source 1: 2,000 acre-feet      Source 1: 3,000 acre-feet
Entity Module                  Entity Module                  Entity Module                  Entity Module


Whole WUG Entity "A" Split 1   Whole WUG Entity "A" Split 2    Whole WUG Entity "B" Split 1   Whole WUG Entity "B" Split 2
Source 1: -1,000 acre-feet     Source 1: -2,000 acre-feet     Source 1: -500 acre-feet       Source 1: -600 acre-feet
WMS Module:                    WMS Module:                    WMS Module:                    WMS Module:
WWP/Seller Customer Supply     WWP/Seller Customer Supply     WWP/Seller Customer Supply     WWP/Seller Customer Supply
Reduction WMS                  Reduction WMS                  Reduction WMS                  Reduction WMS


        Whole WUG Entity "A"                            Whole WUG Entity "B"
        Source 1: 3,000 acre-feet                      Source 1: 1,100 acre-feet
        WWP/Seller Customer                            WWP/Seller Customer
        Supply Reduction WMS                           Supply Reduction WMS


                    WWP/Seller Entity XYZ
                    Receives back aggregated WUG Supply Reduction from WUG Customers
                    Source 1:  4,100 acre-feet
                    WWP/Seller Customer Supply Reduction WMS


                    WMS:
                    Existing Supply Reallocation


WMS WUG Recipient 1        WMS WUG Recipient 2        WMS WUG Recipient 3
400 acre-feet             400 acre-feet              400 acre-feet
```
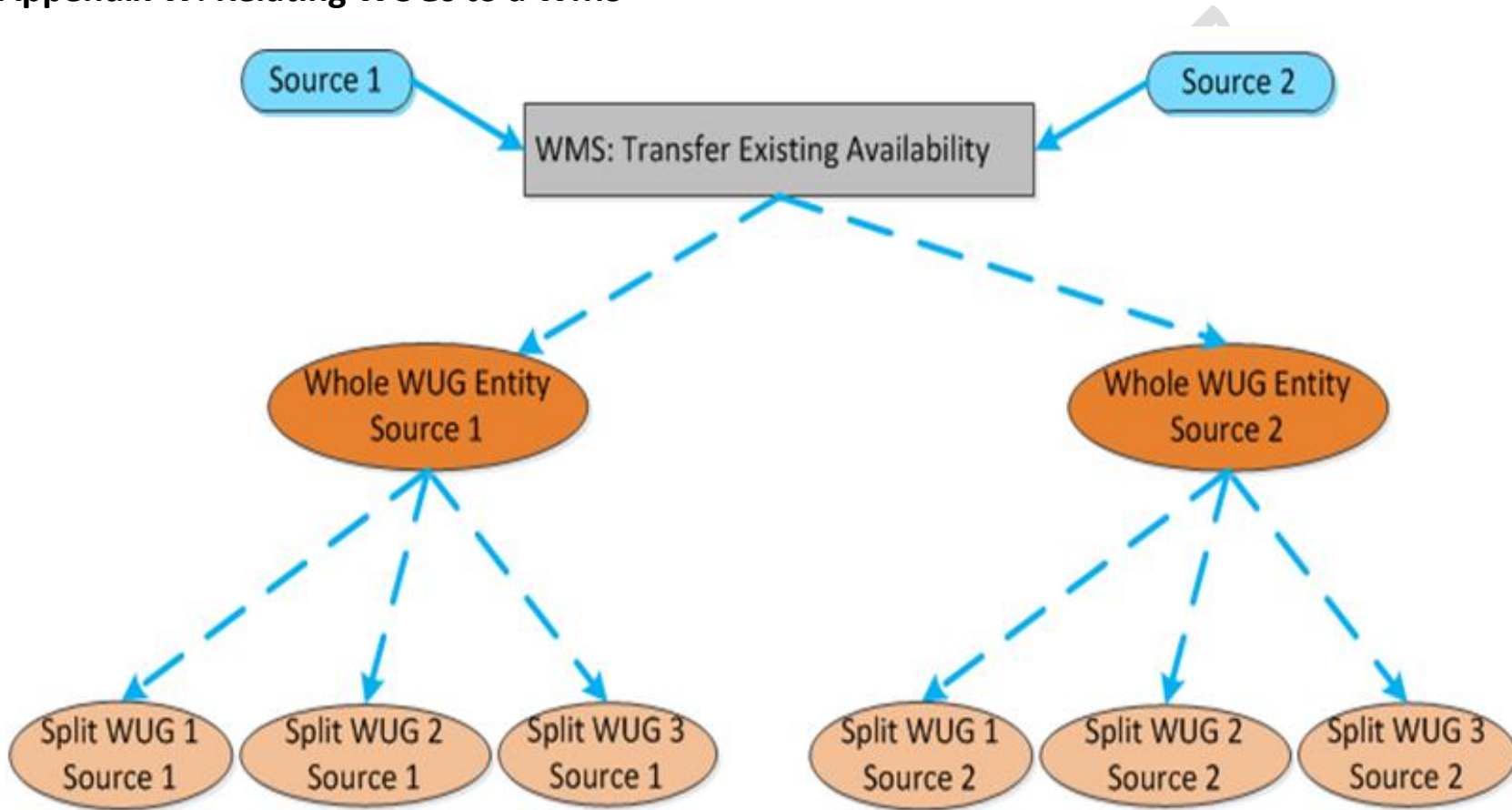
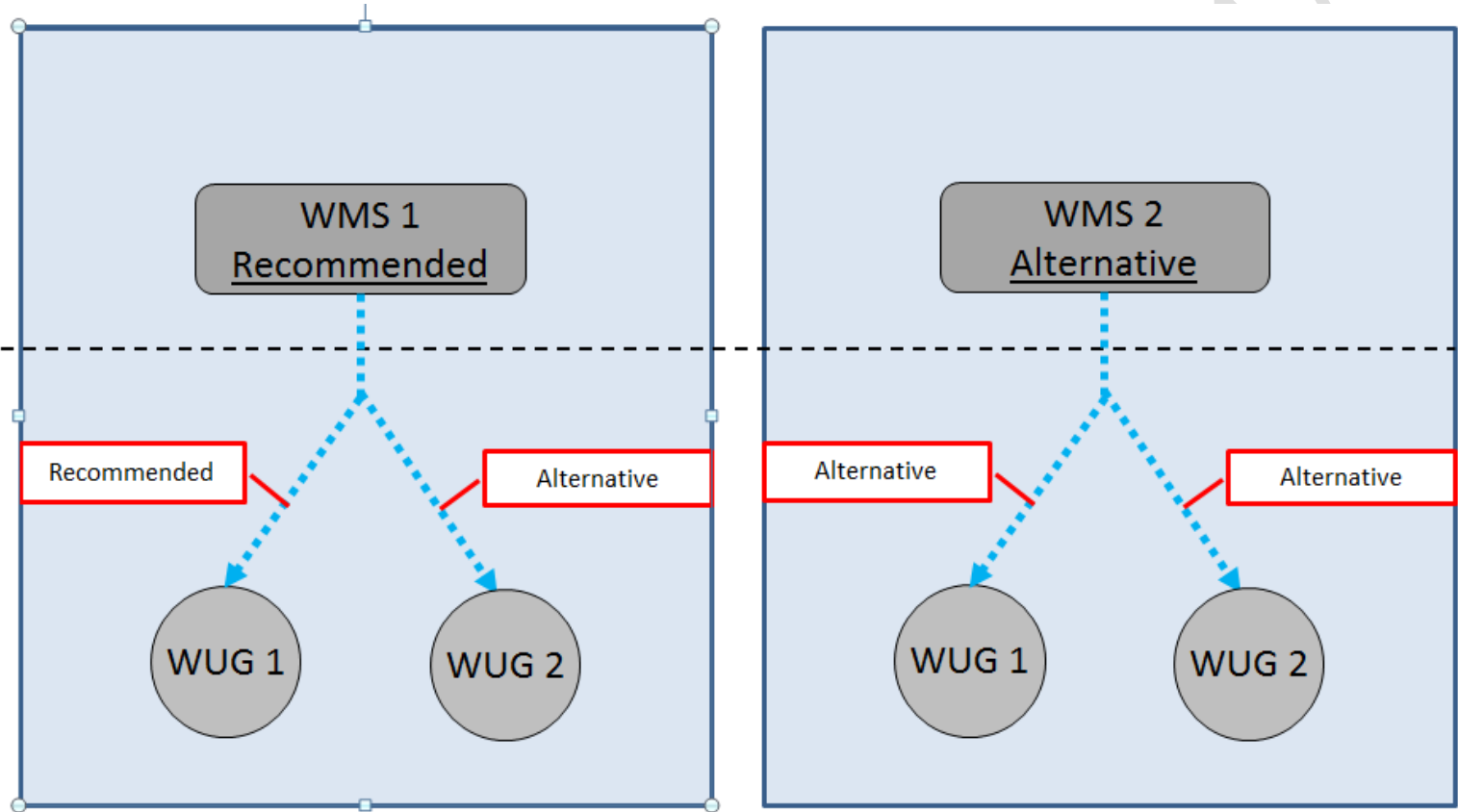## Appendix U - Entity WMS, Demand Reduction

Appendix V - Entity WMS, Demand Reduction Transfer
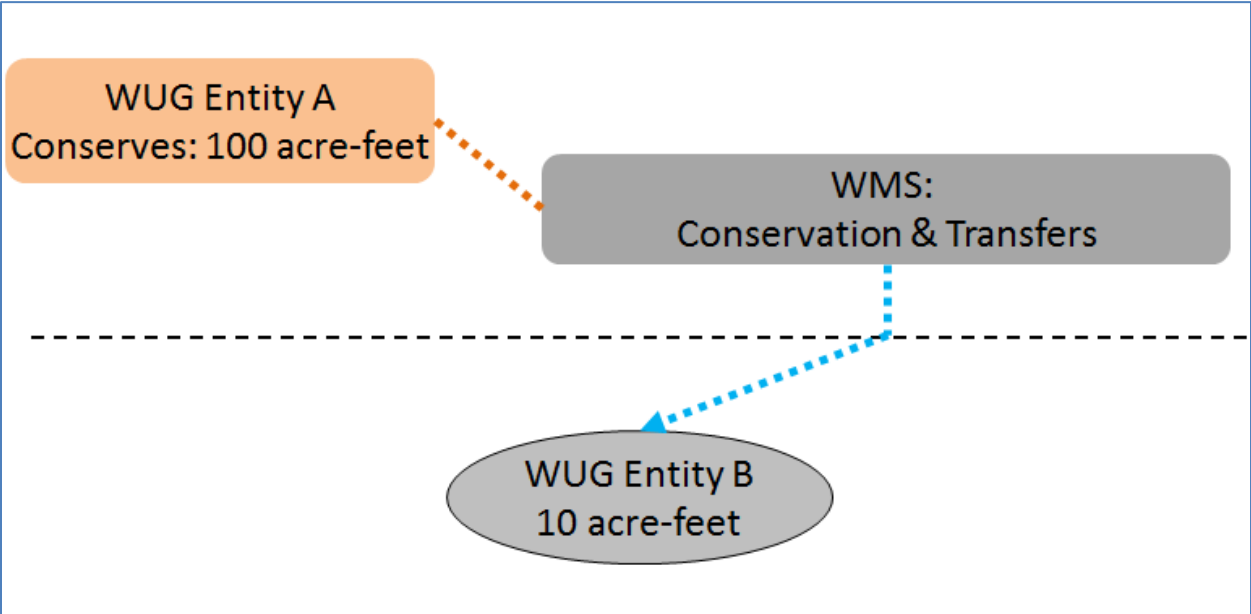
Appendix W: Relating WUGs to a WMS

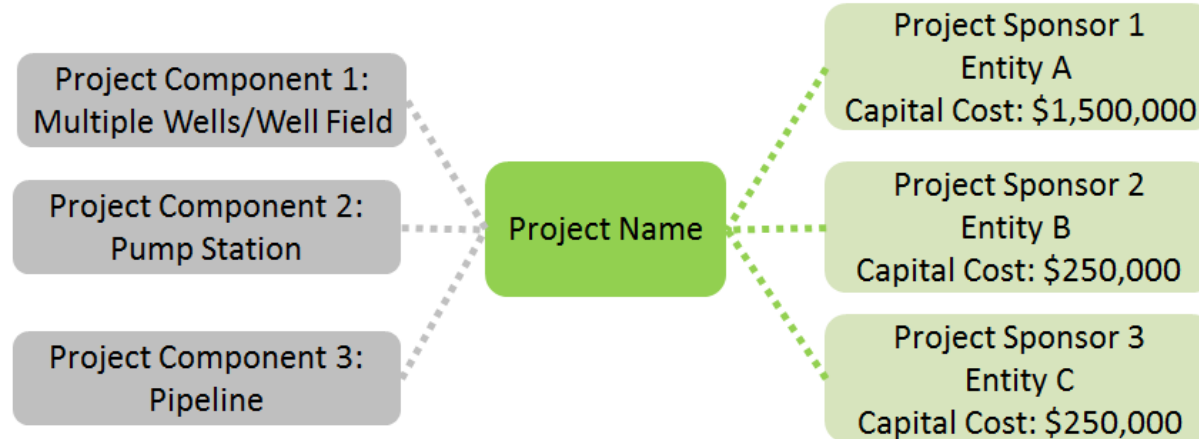## Appendix X: Recommendation Types

**Appendix Y: Project Description**

Appendix Z: Project Component Selection List

Conveyance/Transmission Pipeline - Raw Water
Conveyance/Transmission Pipeline - Treated Water
Canal Lining
On Farm Irrigation Conservation
New Water Treatment Plant - Conventional
New Water Treatment Plant - Desalination/Membrane
Water Treatment Plant Expansion - Conventional
Water Treatment Plant Expansion - Desalination/Membrane
Single Well
Multiple Wells/Well Field
Lower Groundwater Well Pump
Deepen Well
Injection Well
Pump Station
Reservoir Construction
New Surface Water Intake
Lower Surface Water Intake
Raise Conservation Pool
Saltwater Barrier
New Contract
Contract Amendment
New Water Right/Permit
Water Right/Permit Lease or Purchase
Water Right/Permit Amendment
New Agreement
Emergency Temporary Transfer Agreement

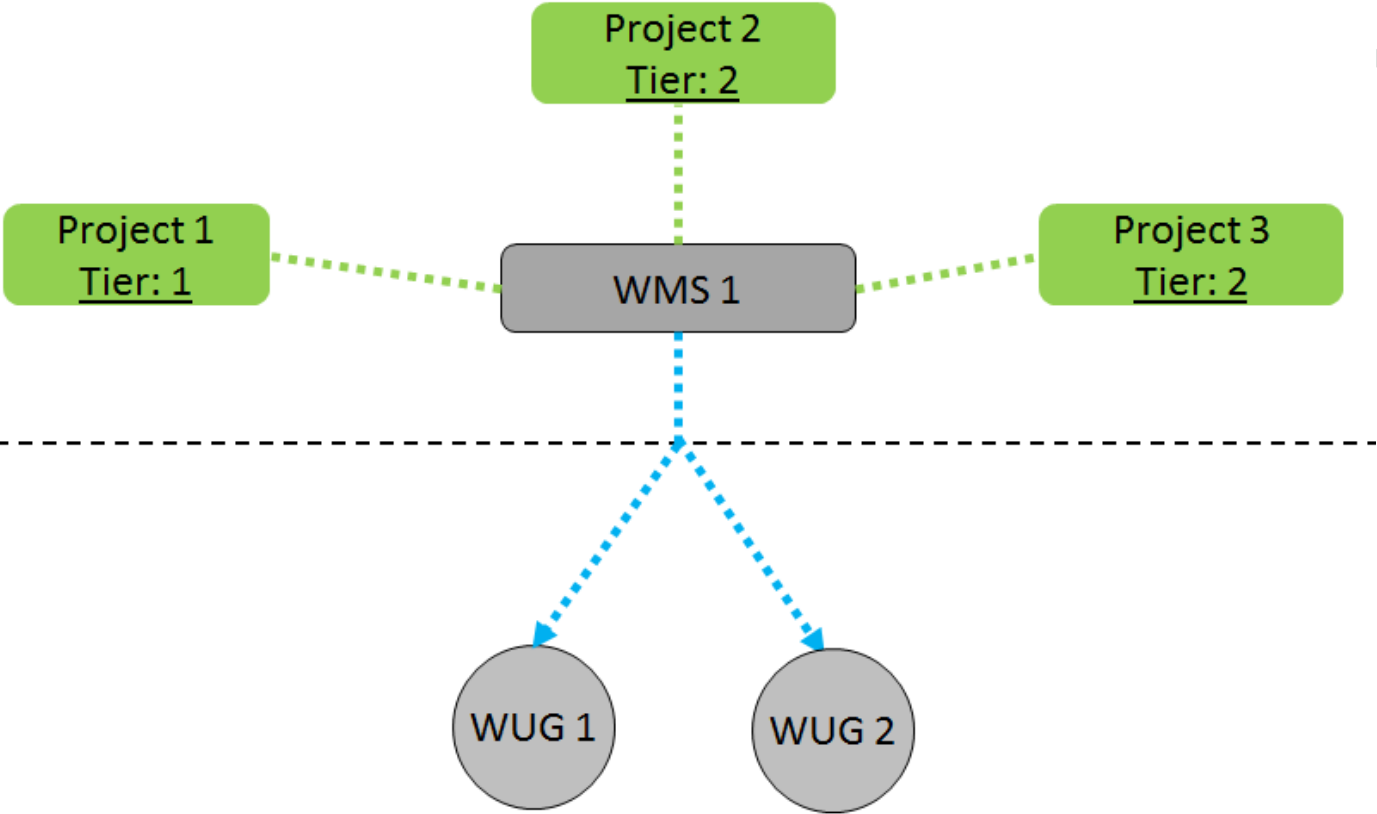## Appendix AA: Relating Projects to a Water Management Strategy
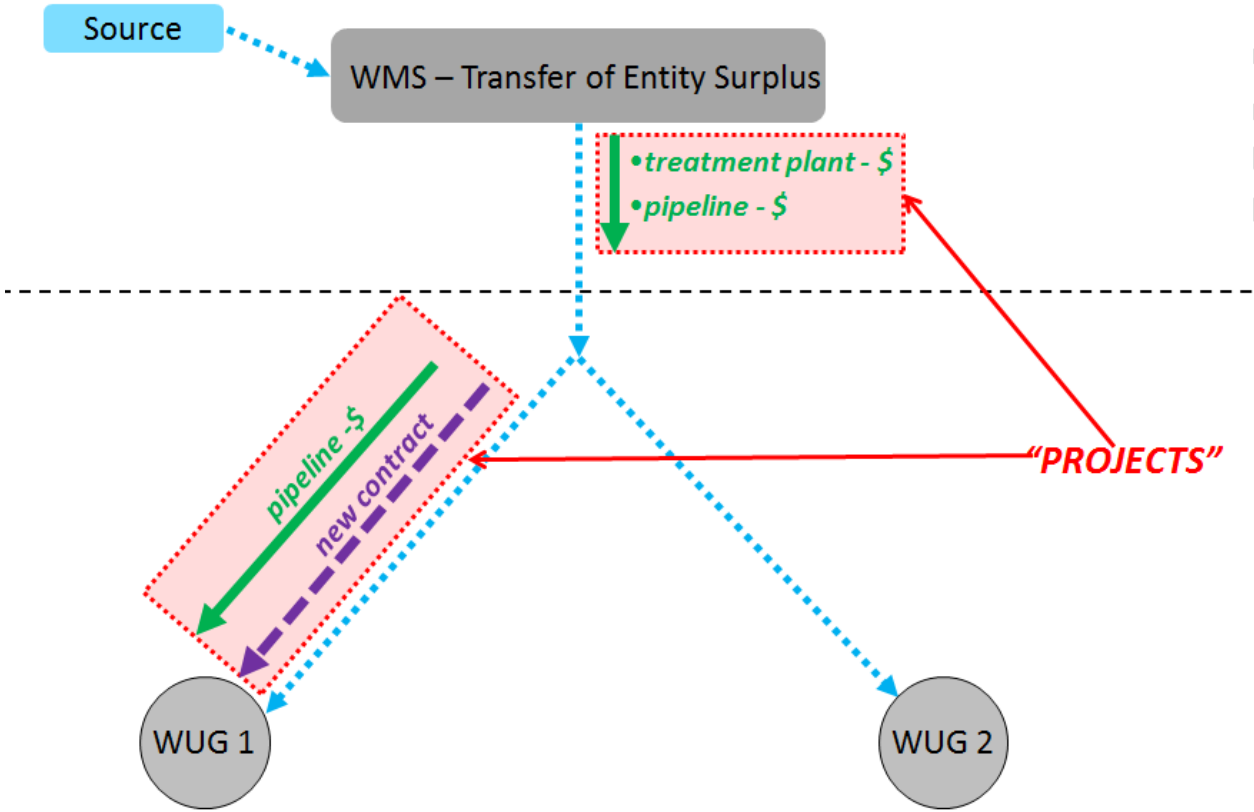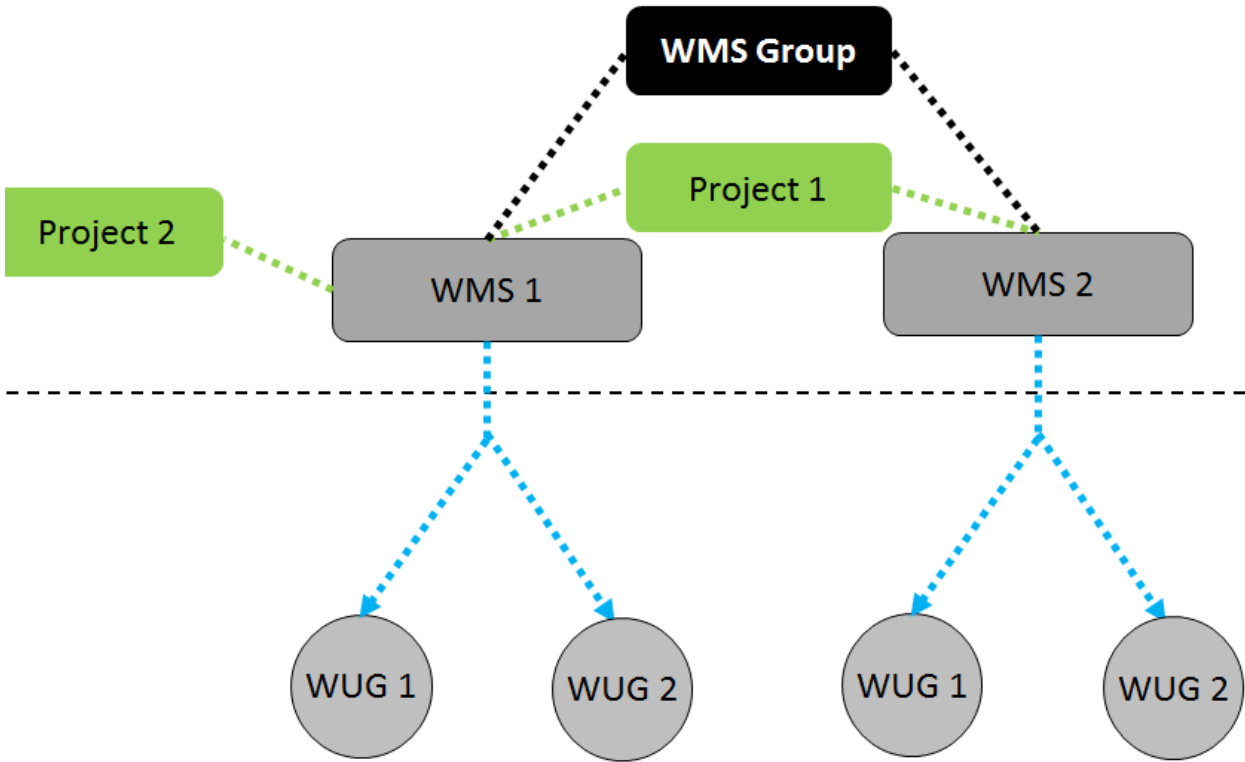
Appendix AB: Project Recommendation Status
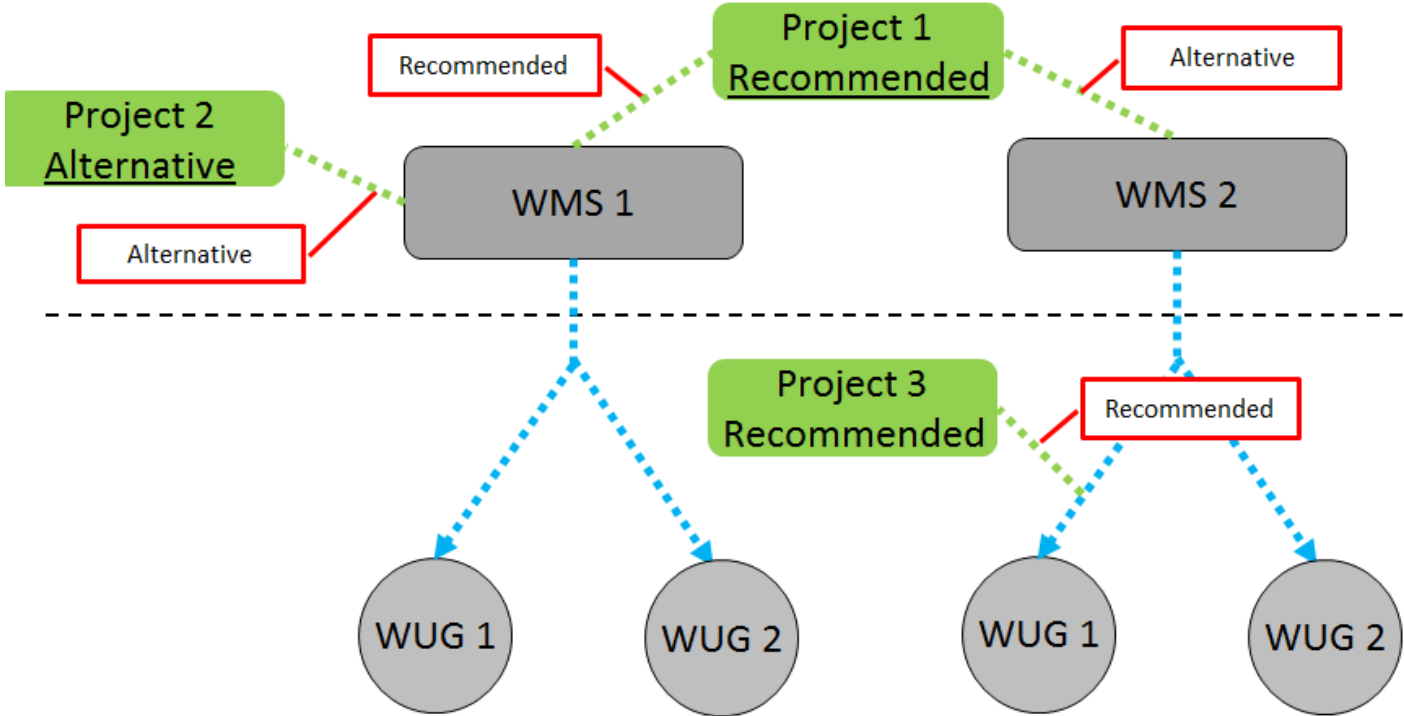
Appendix AC: WMS Project Hierarchy

Appendix AD: Relating Water Management Strategies to a WMS Group

Appendix AE: WMS Group Hierarchy