Chapter 5 Water Management Strategies

Chapter 5 identifies and discusses the water management strategies to meet identified water needs as outlined in **Chapter 4**. These needs are met through a variety of strategies that have been developed through coordination with the water users in Region C.

Over the planning period water users may need to upgrade or modify their water supply systems or develop new supplies in ways that are not specifically identified in this plan. For aggregated water users, such as county other, the identification of needs and projects can be challenging due to the county-wide nature of the planning effort. It is the intent of this plan to include all water systems that demonstrate a need for water supply. This includes established water providers and new water suppliers that may be formed in the future to provide a reliable water supply.

The Region C Regional Water Plan outlines a potential approach that water suppliers can take to meet their projected water needs. Actual implementation of the water management strategies discussed within this plan is the responsibility of the water suppliers. The details of strategies will evolve as they are implemented. The Region C Regional Water Planning Group will not be implementing water management strategies and does not want this plan to be an obstacle in the development of needed water supplies.

Chapter Outline

5A - Methodology for Evaluation and Selection of Water Management Strategies

5B - Conservation and Reuse

5C - Major Water Management Strategies

5D - Major Water Providers

5E - Water Management Strategies by County

5F - Summary of Recommended Plan

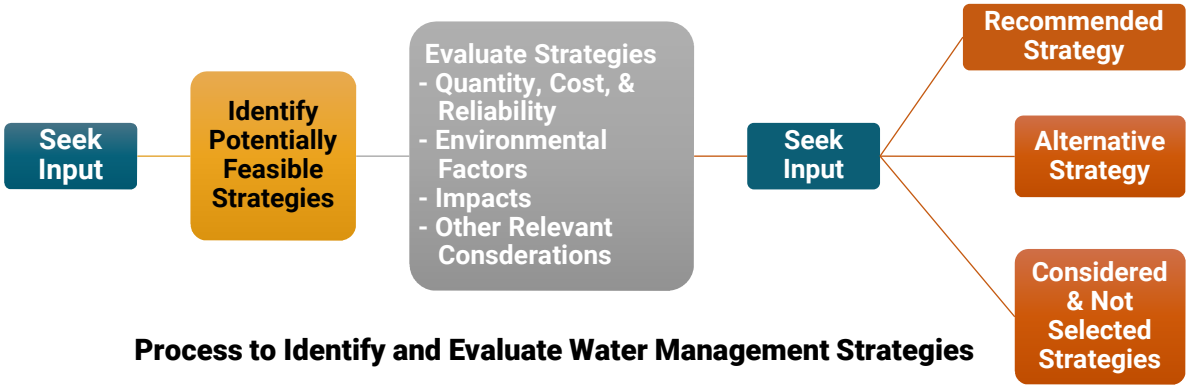
5A Methodology for Evaluation and Selection of Water Management Strategies

This section describes the process to determine potentially feasible strategies for Region C as well as the methods used to evaluate potentially feasible strategies and select recommended or alternative strategies.

The steps in the identification of water management strategies for Region C includes the following steps:

- Review previous plans for water supply in Region C, including locally developed plans and the 2017 State Water Plan [(1)];
- Consider the types of water management strategies required by Senate Bill One regional planning guidelines [(2)];
- Consider feasibility screening criteria for management strategies (the strategy must have an identifiable sponsor, must be technically feasible, and must meet existing regulations);
- Seek input from water providers and RCWPG members on potential strategies;
- Evaluate strategies based on the criteria set forth by the TWDB;
- Present the data to the potential sponsors and seek concurrence with recommendations;
- Select recommended strategies for Region C for approval by the RCWPG.

The process to identify potentially feasible water management strategies was presented at a public meeting and approved by the RCWPG on December 18, 2017. A list of the identified potentially feasible water management strategies is included in **Appendix F**.



Process to Identify and Evaluate Water Management Strategies

Chapter Outline

Section 5A.1 – Types of Water Management Strategies

Section 5A.2 – Methodology for Evaluating Water Management Strategies

Related Appendices

Appendix F – Potentially Feasible Water Management Strategies

Appendix G – Water Management Strategy Evaluations

5A.1 Types of Water Management Strategies

Regional Planning guidelines require that certain types of water management strategies be considered for developing additional water supplies [2].

The Region C Water Planning Group reviewed each of these types of water management strategies and determined whether there were potentially feasible strategies to develop water supply in Region C within each type. Water conservation strategies are discussed in **Chapter 5B**. Drought response planning is discussed in **Chapter 7**.

Other types of management strategies are discussed below, and a detailed listing of potentially feasible water management strategies for Region C is included in **Appendix F**. The evaluations of the potential water management strategies are discussed in **Appendix G**.

Water Management Strategies

The RWPGs shall consider, but not be limited to considering, the following types of WMSs for all identified water needs:

- Water Conservation
- Drought Management Measures
- Wastewater Reuse
- Management and/or Expanded Use of Existing Supplies
  - System Optimization
  - Connection of Existing Supplies
  - Conjunctive Use
  - Reallocation of Reservoir Storage
  - Voluntary Redistribution of Water Resources
  - Voluntary Subordination of Water Rights
  - Yield Enhancement
  - Water Quality Improvements
- New Supply Development
  - Surface Water Resources
  - Groundwater Resources
  - Desalination
  - Water Right Cancellation
  - Brush Control
  - Rainwater Harvesting
  - Precipitation Enhancement
- Aquifer Storage and Recovery (ASR)
- Interbasin Transfers
- Emergency Transfers of Water

5A.1.1 Water Conservation

Water conservation is defined as "those practices, techniques, and technologies that will reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses."[3] Water conservation measures typical result in long-term, on-going changes in water use.

Water conservation is a valued water management strategy in Region C because it helps reduce the growing demands of the region. It is recommended for all individual municipal water users, whether the user has a defined shortage or not. For rural municipal water users, conservation is recommended for County Other users with per capita use above 140 gallons per person per day. This is the State goal for municipal water conservation. Conservation is also recommended for all non-municipal users that are shown to have a shortage as appropriate.

Summary of Decision: Consider conservation for all individual municipal water users, County Other water user groups with per capita use above 140 gallons per person per day, and non-

municipal water users with a need as appropriate.

5A.1.2 Drought Management Measures

Drought management measures are actions taken by a water provider during drought to reduce demands. Region C did not consider drought management as a feasible strategy to meet long-term growth in demands or currently identified needs. Drought management measures are temporary actions to conserve available water supplies during times of drought or emergencies. These measures minimize the adverse impacts of water supply shortages during drought. Drought management will be employed in the region through the implementation of local drought contingency plans. Region C is supportive of the development and use of these plans during periods of drought or emergency water needs.

Summary of Decision: Do not consider Drought Management Measures to meet long-term water needs.

5A.1.3 Wastewater Reuse

Wastewater reuse utilizes treated wastewater effluent either by direct diversion from a wastewater plant to a use (direct reuse) or by delivery of water through streams or lakes for use (indirect reuse). Wastewater reuse is a major source of water for Region C water providers. As demands increase, the available wastewater effluent also increases. Some providers have projects in place today to utilize the increased effluent. Others are planning to construct new projects to treat and transport the reuse water to the end user. Several major water providers are working together to maximize the available reuse to the region.

Summary of Decision: Include wastewater reuse as part of the water management strategies considered in the Region C plan.

5A.1.4 Management and/or Expanded Use of Existing Supplies

Expanded use of existing supplies includes eight subcategories ranging from selling developed water that is not currently used to enhancing existing supplies through operations, storage, treatment or other means. Each of these subcategories were considered during identification of potentially feasible strategies, and the applicability to Region C is discussed below.

System Optimization. System optimization is the coordinated use of multiple sources of supply, usually surface water reservoirs. This can also include development of regional water supply facilities of providing regional management of water supply facilities. System optimization is widely used throughout Region C, and can be implemented for many purposes, including gaining yield, reducing pumping costs, or maintaining acceptable water quality. Most of the systems in Region C are operated primarily to reduce pumping costs. For the purpose of the Region C planning process, only system operation that results in increased yield will be considered as potentially feasible water management strategies. Generally, only system operation with new water supplies is considered for evaluation as a water management strategy for the Region C Water Plan. Any increase in supplies due to system optimization is included as part of the respective strategy. No strategies were identified for existing

reservoir system operations that increase yield above the current supply amounts.

Summary of Decision: System optimization is widely used in Region C, primarily to reduce pumping costs. Potentially feasible system operation strategies to provide additional yield should be investigated as part of other new strategies.

Connection of Existing Supplies. The connection of existing supplies that are not yet being fully utilized is a major element of the *Region C Water Plan*. There are several sources of water supply that have long been committed for use in Region C and could be connected to provide additional water supply. Region C water suppliers could potentially connect to currently uncommitted supplies in other regions through new, renewed or increased contracts or agreements with the seller of the water. This category also includes improvements to infrastructure to utilize the water, such as new or renovated transmission systems and water treatment plants.

Major sources of existing water considered for new connections to Region C water users include: Lake Palestine, Lake Texoma, Toledo Bend Reservoir, Lake O' Pines, and water from Oklahoma. Other existing sources are considered for expanded use and voluntary sales to others.

Summary of Decision: Include connection of existing supplies as a major component of the Region C plan. Evaluate specific potentially feasible strategies for connection of existing supplies.

Conjunctive Use of Groundwater and Surface Water. In Region C only about 6 percent of the water used currently comes from groundwater. However, as water providers expand their portfolios of water sources, groundwater and conjunctive use will become more important in developing resilient supplies. When used conjunctively, groundwater can help meet higher dry year demands in systems that have both groundwater and surface water supplies, while more surface water is used during normal to wet years.

Summary of Decision: Consider conjunctive use for Region C providers that have both groundwater and surface water sources. Generally, this will be considered as part of new groundwater strategies.

Reallocation of Reservoir Storage. Reallocation of water storage from a non-water supply use (such as hydropower generation or flood control) is the development of new water supply. Evaluation of reallocation of reservoir storage must consider available unappropriated water and seek appropriate authorizations. This strategy type can only apply to those reservoirs that dedicate storage for a non-water supply use. For Region C, that includes mainly reservoirs operated by the USACE.

Summary of Decision: Evaluate storage reallocation to water supply for Lake Texoma, Wright Patman Lake, and Bardwell Lake.

Voluntary Redistribution of Water Resources. In many cases, the connection of existing sources and the development of new sources require the voluntary redistribution of water resources by sale from the owner of the supply to the proposed user. (This would be true unless the proposed user is also the owner of the supply.) The water management strategies involving the voluntary redistribution of water resources are often discussed under other categories.

Summary of Decision: Evaluate potentially feasible strategies involving the voluntary redistribution of water resources as a unique strategy or as part of other strategies.

Voluntary Subordination of Water Rights

Voluntary subordination of water rights is useful where senior water rights limit reservoir yields under the prior appropriations doctrine.

Very little additional yield is available for existing reservoirs in Region C by voluntary subordination. This strategy is appropriate for new water supply sources that would have junior water rights.

In Region C, subordination of water rights is necessary to obtain the permitted amount for Muenster Lake in Cooke County.

Summary of Decision: Include voluntary subordination of water rights as a source of water supply for Muenster Lake and others as appropriate.

Yield Enhancement

Enhancement of surface water yields would generally include system optimization and conjunctive use, which are listed separately.

Enhancement of groundwater yields would include artificial recharge, which could include several methods. Artificial recharge of aquifers has not been implemented or studied in depth in Region C. If artificial recharge were to be implemented, it would likely be as part of an aquifer storage and recovery (ASR) program, which is discussed separately.

Summary of Decision: Do not include enhancement of yields of existing sources as a source of water supply for Region C water users except as discussed under other categories.

Water Quality Improvements

Water quality improvements allow for the use of impaired water for municipal or other uses. Generally, this strategy is considered for users with existing water supplies but impaired water quality. In Region C, there are some users of brackish surface water and groundwater. Water quality improvement for these sources are typically accomplished through desalination or blending. This is discussed under the strategy type "Desalination". Other types of water quality improvements can be applied at a watershed level, such as the Red River Chloride Control Project. The Chloride Control Project is only partially implemented. Should this project move forward, some benefits may be realized in Lake Texoma. While chloride control is a concern for some users in Region C, this strategy type also would apply to treatment of other water quality parameters.

Summary of Decision: Consider water treatment improvements for users of supplies with impaired water quality.

5A.1.5 New Supply Development

New supply development is a critical component of the *Region C Water Plan*. With a regional projected water need of 1.3 million acre-feet per year by 2070, these shortages cannot be met through conservation and existing supplies alone. Most of the new supply development will be new surface water, but other strategy subtypes were also considered.

Surface Water Resources

New surface water includes a variety of strategies, but all include new appropriations of state water. New reservoirs represent a large source of potential supply for Region C. To develop a

new reservoir, both a state water right permit and a federal Section 404 permit are required. The permitting process alone can take multiple decades, depending upon the project. Design, construction and filling of the reservoir can add another 10 to 15 years. Because of the large amount of time needed to implement new reservoir strategies, long-term planning for these types of strategies is essential for implementation by the time the supply is needed. As a result, many of these potential reservoirs have been previously studied. Seven potential new reservoirs are being considered for the *Region C Water Plan*.

Other new surface sources include two proposed river diversions with off-channel storage, Neches Run-of-River and Red River Off-Channel Reservoir.

In addition, DWU is proposing to construct an off-channel reservoir in Ellis County for impounding wastewater return flows and potentially new appropriations. This strategy is considered under wastewater reuse.

Summary of Decision: Evaluate new reservoirs and river diversions as potentially feasible strategies.

Groundwater Resources

New groundwater supplies within Region C are limited since most of the available groundwater supplies are already developed. However, there may be opportunities to expand current use in specific areas. Also, several water providers are considering importing groundwater from outside the region.

Summary of Decision: Evaluate the importation of groundwater as considered by potential sponsors. Evaluate specific potentially feasible groundwater supplies within Region C.

Potential New Reservoirs

- Bois d'Arc Lake
- Lake Ralph Hall
- Lake Tehuacana
- Lake Columbia
- Marvin Nichols Reservoir
- George Parkhouse Lake (North)
- George Parkhouse Lake (South)

Desalination

The salinity of water in Lake Texoma and the Red River is too high for municipal use. The water must be desalinated or blended with higher quality water in order to meet drinking water standards. For strategies that propose new development of water from these sources, desalination would be needed. The cost of desalination has decreased in recent years, and the process is being used more frequently.

Desalination is a potentially feasible strategy to use supplies from the following sources:

- Lake Texoma and the Red River
- Brackish groundwater
- Water from the Brazos River
- Water from the Gulf of Mexico
- Local projects from other sources, if pursued by water suppliers.

Summary of Decision: Include desalination as a potentially feasible water management strategy in order to utilize supplies that require desalination for the planned use.

Water Right Cancellation

The Texas Commission on Environmental Quality has the power to cancel water rights after ten years of non-use, but this involuntary cancellation authority has

seldom been used. The Water Availability Models showed that very little additional supply would be gained from water right cancellation in Region C [4]. Therefore, water rights cancellation is not recommended as a potentially feasible water management strategy for Region C.

Summary of Decision: Do not consider water rights cancellation as a potentially feasible strategy for the development of additional water supplies.

Brush Control

Brush control is the process of removing non-native brush from the banks along rivers and streams and upland areas in order to reduce water consumption by vegetation and increase stream flows and groundwater availability. Studies and pilot projects of brush control in West Texas show promising results. Two reservoirs in Region C, Lake Jacksboro and Lake Weatherford, were listed in the State Brush Control Plan as potential watersheds where brush control could enhance supplies. No formal studies have been conducted for either watershed. Given that there is no quantifiable evidence that brush control would increase water supply in either reservoir, brush control is not recommended as a potentially feasible water management strategy for any specific water user group (WUG) in Region C. However, brush control may be a management strategy for localized areas within the region, especially as a means to help meet localized livestock water supply needs.

Summary of Decision: Allow for studies and localized pilot projects to further investigate brush control. Do not consider brush control as a potentially feasible strategy for the development of additional water supplies.

Rainwater Harvesting

Rainwater harvesting is an ancient practice involving the capture, diversion, and storage of rainwater for landscape irrigation, drinking and domestic use, aquifer recharge, and in modern times, stormwater abatement. Due to a lack of detailed data on the quantity of supplies that would be made available through rainwater harvesting, this strategy is no recommended as a potentially feasible water management strategy for any specific water user in Region C. However, there may be localized areas in Region C who might benefit from such a management strategy.

Summary of Decision: Allow for studies and localized pilot projects to further investigate rainwater harvesting. Do not consider rainwater harvesting as a potentially feasible strategy for the development of additional water supplies.

Precipitation Enhancement

Precipitation enhancement involves seeding clouds with silver iodide to promote rainfall. Such programs are generally located within areas where the rainfall is lower than in Region C. Given that Region C has adequate rainfall, and that there are no studies showing what impact precipitation enhancement would have on streamflow and reservoirs in Region C, precipitation enhancement is not recommended as a potentially feasible water management strategy for Region C. However, there may be localized areas in Region C who might benefit from such a management strategy.

Summary of Decision: Do not include precipitation enhancement as a potentially feasible strategy for the development of additional water supplies. Allow for studies and localized pilot projects to further investigate precipitation enhancement.

5A.1.6 Aquifer Storage and Recovery

Aquifer storage and recovery (ASR) involves storing water in aquifers and retrieving this water when needed. The water to be stored can be introduced through enhanced recharge or more commonly injected through a well into the aquifer. If an injection well is used, Texas law requires that the water not degrade the quality of the receiving aquifer. Source water for ASR can include excess surface water, treated wastewater, or groundwater from another aquifer.

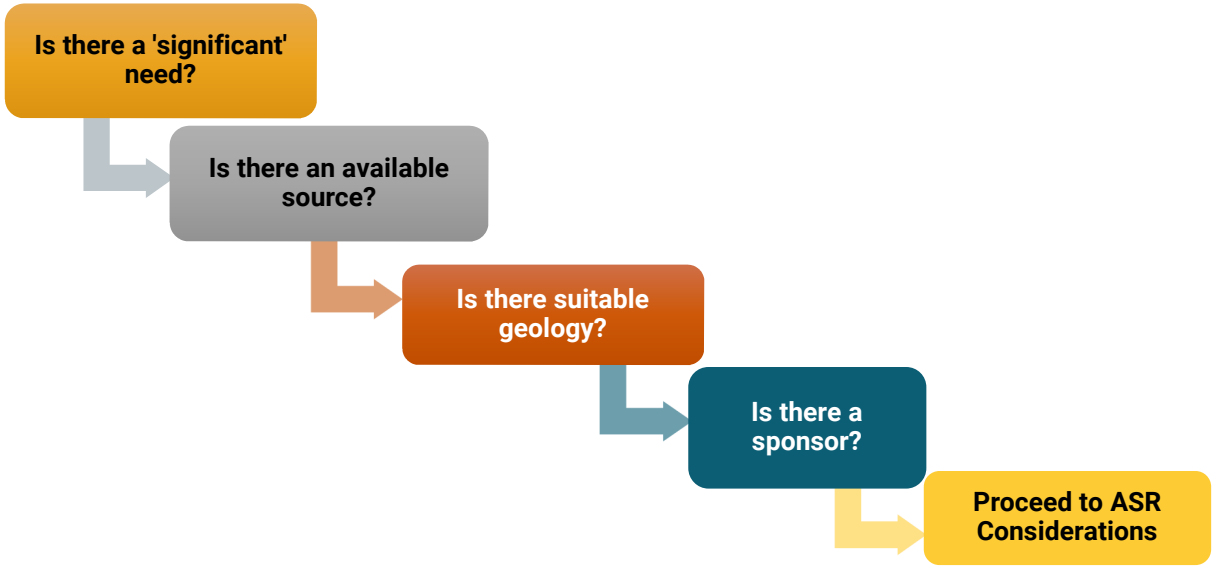
Recent legislation passed by the 86th Texas Legislature and signed by the Governor on June 10, 2019 requires the regional water plans to consider ASR and provide a specific assessment of this strategy if the region has significant needs. The definition of significant need is deferred to each region. For purposes of this assessment, the Region C major water providers are shown to have significant needs.

To determine the feasibility and applicability of ASR, there are several technical considerations. Specifically,

- ASR requires suitable geological conditions for implementation. Since geologic conditions vary by location, studies must be performed to determine what specific locations would be suitable for ASR. There is little data available on the suitability of ASR in Region C.
- Raw surface water and wastewater reuse most likely will require pretreatment prior to injection and treatment to drinking water standards after retrieval.
- Operation of an ASR system could significantly impact the amount of water that is retrievable.

Summary of Decision: Develop a large-scale generic strategy for ASR that could be implemented by one or more of the Region C major water providers. Consider small-scale projects that are more likely to be implemented. Support continuing studies of ASR and implementation of pilot projects.

ASR Decision Matrix



5A.1.7 Interbasin Transfers

Interbasin transfers are a legal requirement associated with moving surface water from one basin to another. This legal requirement potentially will be in effect for new surface water supplies developed in one river basin and used in a different river basin. Additional detailed studies for the receiving and the source basins will be required as part of the permitting process for new interbasin transfers. This strategy category may be a component of several other strategy types, including new surface water development, connecting to existing supplies, and voluntary transfer of water. Development of adequate supplies for Region C and the other growing areas of Texas will require interbasin transfers.

Summary of Decision: Include interbasin transfers as part of the management strategies considered in the Region C plan.

5A.1.8 Emergency Transfers of Water

Emergency transfers of water could include interim water sales during drought or emergency conditions, transfers of water from one use type to another use type, emergency interconnections, and other similar types of projects. Like drought management, such transfers are considered temporary and not appropriate to meet long-term growth water demands. This type of strategy is reserved for emergency use only.

Summary of Decision: Emergency transfers of water are reserved for emergency use only.

5A.1.9 Summary of Potentially Feasible Strategies

Appendix F includes a listing of potentially feasible water management strategies for Region C for major and regional water providers, wholesale water providers, and for all water user groups by county.

A list of the major strategies, defined as providing more than 30,000 acre-feet per year, is presented in **Table 5A.1**. The results of the evaluation and the recommended strategies for Region C are discussed in the subsequent sections of **Chapter 5** and detailed in **Appendix G**.

Table 5A.1 List of Major Potentially Feasible Water Management Strategies

Potentially Feasible Water Management Strategy	Potential Sponsor	Maximum Supply Available (Ac-Ft/Yr)
Reuse Strategies		
Cedar Creek Wetland Reuse	TRWD	88,059
Reuse from TRA Central WWTP	TRWD	60,000
Indirect Reuse Implementation	DWU	62,559
Main Stem Balancing Reservoir	DWU	95,829
Additional Lavon Watershed Reuse	NTMWD	38,780
Expanded Wetland Reuse	NTMWD	37,510
Connection of Existing Supplie		
Integrated Pipeline	TRWD, DWU	313,880
Connect to Lake Palestine (IPL Delivery Point to Bachman WTP)	DWU	105,370
Lake Texoma (Blending)	NTMWD and UTRWD	138,933
GTUA Regional System	GTUA	35,872
Water from Oklahoma	NTMWD, UTRWD, Irving	55,000
Sabine Conjunctive System Operations	DWU	104,200
Toledo Bend Reservoir	NTMWD, TRWD, UTRWD, DWU	350,000
Lake O' the Pines (Cypress Basin Supplies)	NTMWD	50,000
New Surface Water		
Bois d'Arc Lake	NTMWD	120,200
Lake Ralph Hall	UTRWD	39,220
Lake Ralph Hall Reuse	UTRWD	15,428
Marvin Nichols Reservoir	NTMWD, UTRWD, TRWD, DWU and/or Irving	361,200
George Parkhouse Reservoir (North)	NTMWD and/or UTRWD	85,200
George Parkhouse Lake (South)	NTMWD and/or UTRWD	92,800
Wright Patman Reallocation	NTMWD, UTRWD, TRWD, DWU and/or Irving	122,200
Lake Columbia	DWU	56,000
Red River Off Channel Reservoir	DWU, UTRWD	114,000
Neches River Run-of-the-River Diversion	DWU	47,250
New Groundwater		
Carrizo-Wilcox Aquifer	NTMWD, TRWD, DWU	104,000
Desalination		
Gulf of Mexico with Desalination	Multiple	200,000
Lake Texoma with Desalination	NTMWD, GTUA, DWU, Denison	223,000
Aquifer Storage and Recovery (ASR)		
Aquifer Storage and Recovery	Multiple	50,000

5A.2 Methodology for Evaluating Water Management Strategies

The TWDB guidelines set forth certain factors that are to be considered by the regional water planning groups in the evaluation of water management strategies [(2)]. This subsection discusses the specific evaluation factors selected by the Region C Water Planning Group for the potentially feasible water management strategies, including the environmental evaluation of alternatives and the development of costs. Additional details on the environmental evaluations, the development of costs, and the evaluation of strategies are included in various appendices.

5A.2.1 Factors Considered in Evaluation

The factors specifically considered by the Region C Water Planning Group in the evaluation of potential water management strategies are summarized in the blue box at the right. As required, the evaluation of water management strategies includes the quantitative reporting of quantity, reliability, costs and environmental factors. While the quantitative reporting of water made available and the unit cost of delivered and treated water can readily be developed, data for the quantitative reporting of environmental factors are limited. The detailed quantitative assessment of environmental factors requires data from site-specific studies, which are often not conducted at the planning level. Available data for environmental factors are used in the evaluation.

Consistency with plans of Region C water suppliers is an important factor in the evaluation of strategies. It is the intent of the Region C Water Planning Group to consider the existing plans of the water suppliers in the region, especially the major and regional wholesale water providers, in the development of the *Region C Water Plan*.

Equitable comparison of all feasible strategies is not included as an explicit evaluation factor because it describes the way the entire evaluation is conducted. This factor was considered in the development of the methodology for evaluations. Interbasin transfer requirements in the Texas Water Code were considered in the development of strategies.

Water Management Strategy Evaluation Factors

- Quantity of water made available
- Reliability of supply
- Unit cost of delivered and treated water
- Environmental factors including:
  - Total acres impacted
  - Wetland acres
  - Environmental water needs
  - Wildlife habitat
  - Threatened and endangered species
  - Cultural resources
  - Bay and estuary flows
  - Water quality
  - Other
- Impacts on agricultural and rural areas
- Impacts on natural resources
- Impacts on other water management strategies and possible third-party impacts
- Impacts to key water quality parameters
- Consistency with plans of Region C water suppliers

5A.2.2 Environmental Evaluation

The environmental evaluation of potentially feasible management strategies is summarized in **Appendix G**. Factors reported quantitatively include the total acres impacted by the strategy and the number of threatened and endangered species listed in the counties of the proposed water source. For existing water sources, only the species that are water dependent are included in the count of threatened and endangered species. Other factors were assigned a high, moderate, or low rating based on existing data and the potential to avoid or mitigate each of the environmental factors listed in on the previous page. These evaluations were summarized in an overall environmental evaluation for the strategy. Certain management strategies were evaluated as a category rather than individually because their environmental effects do not vary greatly. Examples of evaluation by category include purchasing water from another provider and development of new wells in aquifers with additional water available.

5A.2.3 Agricultural Resources and Other Natural Resources

The evaluation of impacts to agricultural resources and rural areas assesses the ability to continue current agricultural and livestock activities. Strategies that move considerable amounts of water from rural to urban areas were also considered under this category. The impacts of recommended strategies on these factors are discussed in more detail in **Chapter 6**.

Impacts to other natural resources include potential impacts to water resources that are not the direct source for the strategy and impacts to mineral resources, oil and gas, timber resources, and parks and public lands. (Impacts to the water resources that are the source for the strategy are included under environmental factors.) The considerations of the impacts to agricultural and natural resources are used to assess how the regional water plan is consistent with the protection of the state's resources. This discussion is also summarized in **Chapter 6** of the plan.

5A.2.4 Recommended Water Management Strategies

Water management strategies are recommended based on the overall factors set forth in the strategy evaluations. As discussed above, consistency with the on-going water development plans of regional water providers is an important factor in the strategy selection. All factors are considered in the selection process. The recommended strategies are based on the ability to supply the quantity of water needed at a reasonable cost, while providing long-term protection of the state's resources.

5A.3 Chapter 5A List of References

(1) Texas Water Development Board: *Water for Texas – 2017*, Austin, January 2017.

(2) Texas Water Development Board: Chapter 357, *Regional Water Planning Guidelines*, Austin, November 2019.

(3) Texas Water Code, Title 2, Subtitle B, Chapter 11, Subchapter A. Section 11.002(8)(B). Online: https://statutes.capitol.texas.gov/Docs/WA/htm/WA.11.htm

(4) Freese and Nichols, Inc., Alan Plummer Associates, Inc., CP&Y, Inc., and Cooksey Communications, Inc.: *2011 Region C Water Plan*, prepared for the Region C Water Planning Group, Fort Worth, October 2010.