

**Exhibit C: Scope of Work
2007 – 2009 Regional Water Planning**

Study No. 0 –Public Participation and Administration

This study will support the meetings of the RHWPG through the contract period. In addition, it will provide for required public notices related to application for state funding and developing the scope of work for the planning process, and any additional announcements of public meetings.

- A. Develop scopes of work and budgets for the first biennium regional planning. Coordinate and participate in Scoping Committee meetings. Coordinate, schedule, and participate in a public meeting of the Region H WPG on the next round of planning and proposed scoping items. Prepare and submit public notifications for public meeting.
- B. Prepare materials for and attend meetings of the RHWPG.
- C. Prepare materials for and attend subcommittee meetings of the RHWPG.
- D. Provide logistics, public announcements, prepare materials for and attend public meetings.
- E. Prepare and place public notices of meetings/hearings in newspapers of general circulation in each of the counties in the region when applying for public funds, preparing scopes of work, or soliciting public review and comment.
- F. Provide direct mail notices of meetings/hearings to elected officials, water rights holders and public utilities, as required.
- G. Provide for copying and/or publication of reports as needed for RHWPG and public review and comment.
- H. Establish a Region H Website for posting of Region H documents and information for access by the RHWPG, stakeholders and the public.
- I. Prepare a Work Plan for the third round of planning including scopes, schedules, and budgets for grant activities to be conducted during the first and second biennium.
- J. Prepare recommendations for items which should be amended in the Region H Water Plan during the third round of regional planning based on potential changed conditions, requests from local agencies, or new information made available during this study period.

Work Product

Work products for this task will include:

- A section of Chapter 10 describing the public participation and outreach effort of the RHWPG. It will identify issues suggested by the public that affect water management strategies in the Region H Water Plan and issues that may need to be addressed in future rounds of planning.
- Attendance and technical supporting materials for RHWPG meetings, subcommittee meetings, and public meetings.
- Materials for newspapers and direct mail notices.
- Up to 75 copies of report materials for distribution to RHWPG, stakeholders, resource agencies and public libraries.
- Region H website with capability for:
 - using multiple security levels to allow variable access to draft documents,
 - FTP downloading of large documents,
 - frequent updating of RHWPG materials,
 - timely posting of agendas and meeting materials.
- Draft and final Work Plan for the third-round study activities to be conducted during the first biennium.
- Recommended scope items for third-round amendments to the Region H Water Plan.

Study No. 1 – Environmental Flows Investigations for Region H

A. Impacts of Recommended Water Management Strategies on Galveston Bay Estuary: Analysis of the potential impacts of recommended water management strategies on the amount and timing of freshwater inflows into the Galveston Bay estuary system remains a significant issue for the region. This task will develop additional detailed water availability modeling on a management strategy by management strategy basis to further establish those impacts. Additionally, the potential for mitigation of identified impacts will be considered under various alternative scenarios. In order to ensure compatibility with the adopted State Water Plan, for all sub-tasks, any demand, supply, or water management strategy development and/or analysis will follow methodologies contained and described in Exhibit B of this contract, agency rules, and guidance as used during the preparation of the 2006 Region H Regional Water Plan unless revised by the TWDB.

A.1. Water Availability Modeling

- A.1.1. Establish base conditions for Water Availability Models (WAMs) to be used to demonstrate and compare the potential impacts of proposed future water management strategies using the agreed GBFIG monthly targets for the estuary. Anticipated base conditions for five scenarios including: a) naturalized, b) existing with return flows, c) full authorized diversions

with return flows, d) future 2060 conditions with existing permits only and full return flows (no new reuse permits), and e) future 2060 conditions with return flows and all recommended additional water management strategies including reuse projects as proposed in 2007 Plan.

- A.1.2. Conduct conference call or meet with TWDB staff prior to performing WAM analysis to present a detailed list of WAM modeling assumptions and modeling procedures to be followed during analysis. Assumptions for WAM revisions shall be approved by the TWDB prior to performing analysis.
- A.1.3. Develop WAM runs for each individual water management strategy (17 total) showing the impact of the individual strategy on the compliance frequency and shortage amount for meeting monthly targets for freshwater inflow as compared to the base conditions.
- A.1.4. Develop summary tables and graphs to demonstrate the impacts of each individual water management strategy and the cumulative impact of all proposed strategies shown as a group.

A.2. Management Scenarios

- A.2.1. Identify possible alternative methods to provide potential mitigation of identified shortages in desired freshwater inflows, including: a) potential for future revisions to existing reservoir operating guidelines to require “pass-through” flows for new and expanded permits; b) potential creation of additional freshwater marsh habitat to replace theoretical loss from increased stress due to loss of freshwater inflows; and c) potential demand reduction measures to be implemented during drought periods to allow natural flows to offset the identified theoretical shortages projected in the WAM runs.
- A.2.2. Conduct conference call or meet with TWDB staff prior to performing WAM analysis to present a detailed list of WAM modeling assumptions and modeling procedures to be followed during analysis. Assumptions for WAM revisions shall be approved by the TWDB prior to performing analysis.
- A.2.3. Compare the effectiveness of the various mitigation methods using the WAMs or other suitable analysis techniques.
- A.2.4. Prepare preliminary planning information to qualitatively define cost and benefits of the various alternative methods.

A.3. Presentations of Results

- A.3.1. Meet with the RHWPG and discuss scope of work and interim results at regularly scheduled planning group meetings.
- A.3.2. Develop interim data and results for all sub-tasks to share with RHWPG at regularly scheduled planning group meetings.

B. Evaluation of Instream Flow Requirements for Future Water Management Strategies: The “default method”, also called the Lyons Method, for evaluating the instream flow requirements in Texas is under consideration at TCEQ for potential change to some other “desk-top methodology”. This task will evaluate the impacts of the Lyons Method on proposed water management strategies and assess the physical characteristics of instream flow requirements for identified critical stream reaches. In order to ensure compatibility with the adopted State Water Plan, for all sub-tasks, any demand, supply, or water management strategy development and/or analysis will follow methodologies contained and described in Exhibit B of this contract, agency rules, and guidance as used during the preparation of the 2006 Region H Regional Water Plan.

B.1. Lyons Method

- B.1.1. For each future water management strategy within the Region H Plan, identify the likely critical stream segment for instream flow considerations and obtain/compute the most appropriate and representative flow data for that reach.
- B.1.2. Determine the allowable diversions under the default Lyons Methodology and compare that value to the proposed diversions.
- B.1.3. Conduct field windshield/walking survey of the stream segment to compare the instream flow results to actual field conditions.

B.2. Other Desk-Top Methodologies

- B.2.1. Collect other readily available information on each critical stream reach such as TPWD surveys, USGS or other agency studies, aerial photography and land use data, information from NPDES stormwater databases, or other hydrologic, ecologic, or habitat information. Compile a matrix listing information available for each critical stream segment.

B.3. Presentations of Results and Preparation of Summary Report

- B.3.1. Meet with RHWPG and discuss scope of work and interim results at regularly scheduled planning group meetings.
- B.3.2. Develop interim data and results for all sub-tasks to share with RHWPG at regularly scheduled planning group meetings.
- B.3.3. Prepare a draft and final report to include the following sections: executive summary, purpose of study including how the study supports regional water planning, methodology, results, and recommendations, if applicable. Draft report will be submitted to the planning group and the TWDB for review and comment. All comments will be addressed in the final report. Report will be prepared to include the data and results described in Tasks A.3.2 and B.3.2 above. The report will be submitted per TWDB requirements and results from this study will be included in the 2011

Region H Regional Water Plan. The development, analysis, and reporting of results will follow methodologies and guidance according to Exhibit B, and agency rules.

Study No. 2 – Impact of Drought Management Strategies on Surface Water Reservoirs in Region H

The statewide priority research study on the role of Drought Contingency/Management strategies in the regional water planning process does not have a defined, finalized scope of work at this time. Funding of a regional study was recommended to and approved by the TWDB with the direction that the Region H study be re-scoped to be complimentary of the statewide priority research study. Given the status of the statewide study, TWDB commits \$75,000 toward the study of drought management strategies in Region H with the understanding that the scope of work for this study will be developed in the future to complement the statewide priority research. No work will be conducted on this study until the scope of work for the Region H study is approved and a notice to proceed is issued by the Executive Administrator.

Study No. 3 – Interruptible Water Supplies

This task will evaluate the availability and the feasibility of using interruptible water supplies to meet some water demands so that users (e.g., agriculture) not requiring firm supply may have access to economical water supply sources in the future. In order to ensure compatibility with the adopted State Water Plan, for all sub-tasks, any demand, supply, or water management strategy development and/or analysis will follow methodologies contained and described in Exhibit B of this contract, agency rules, and guidance as used during the preparation of the 2006 Region H Regional Water Plan.

- A. Evaluate and quantify the availability and dependability of existing permitted interruptible supplies in Region H using a “75-75” rule, that is, 75% of the water supply should be available 75% of the time when distributed on a monthly basis and based upon the historic stream flow record.
 - A.1 Perform an analysis of the “75-75” rule described above to all permitted or contracted water rights in Region H with agricultural, recreational, or other uses which might be amenable to use as interruptible supplies.
 - A.2 Calculate the amount of interruptible supply available for each water right as the amount above the firm yield amount and up to the permitted annual diversion volume.
- B. Evaluate and quantify the availability and dependability of existing permitted interruptible supplies in Region H using the Texas Commission on Environmental Quality (TCEQ) Water Availability Models (WAM) to assess interruptible supplies under various long-term conditions (i.e., return flows, diversions, etc.).
 - B.1 Conduct conference call or meet with TWDB staff prior to performing WAM analysis to present a detailed list of WAM modeling assumptions and modeling procedures to be followed during analysis. Assumptions

- for WAM revisions shall be approved by the TWDB prior to performing analysis.
- B.2 Perform an analysis of the “75-75” rule using the WAM under various conditions including WAM Run 1, Run 3, and Run 8 for all permitted and contracted water rights in Region H which might be amenable to use as interruptible supplies.
 - B.3 Calculate the amount of interruptible supply available for each water right as the amount up to the permitted annual diversion volume.
- C. Evaluate and quantify the availability and dependability of new un-permitted interruptible supplies in Region H using the TCEQ WAM.
- C.1 Conduct conference call or meet with TWDB staff prior to performing WAM analysis to present a detailed list of WAM modeling assumptions and modeling procedures to be followed during analysis. Assumptions for WAM revisions shall be approved by the TWDB prior to performing analysis.
 - C.2 Perform analysis of the “75-75” rule at specific points in the WAM near irrigation demands in Region H under various conditions including WAM Run 1, Run 3, and Run 8 to identify and quantify new un-permitted interruptible supplies.
 - C.3 Evaluate the new un-permitted interruptible supplies identified above using various environmental flow conditions expected (i.e., Lyons method) as a result of applying for new permits.
- D. Evaluate and quantify potential uses for interruptible water supplies within Region H.
- D.1 Evaluate predominant regional crop types and seasonal irrigation requirements and patterns for those crop types.
 - D.2 Survey agricultural users in the region to assess the acceptability and feasibility of using interruptible supplies as a mechanism for maintaining affordable water for agricultural users.
- E. Compare amounts and locations of interruptible supplies compared to amounts and locations of demand to evaluate the feasibility and potential extent of interruptible supply use.
- F. Identify and assess regulatory and institutional issues and constraints associated with this strategy.
- G. Evaluate and quantify additional firm yield supplies made available for municipal and industrial purposes as a result of implementing this strategy.
- H. Evaluate the impacts of the use of interruptible supplies on the size and timing of other water management strategies in Region H.
- I. Determine if the impacts are reasonable, consistent with protection of environmental flows, and consistent with long-term protection of the state’s water resources, natural resources, and agricultural resources.
- J. Evaluate and quantify the economic impacts of this strategy.
- J.1 Based on literature and data obtained from the Texas Agricultural Extension Service, Texas Agriculture Department, universities, and other available sources, assess and evaluate the economic impacts of lost agricultural opportunities for predominant crop types in Region H.

- J.2 Using the results from the TCEQ WAM analysis conducted as part of this study, assess and evaluate the frequency and duration that interruptible supplies would not be available for use over the period of record for the WAM.
- J.3 Based on the frequency and duration that interruptible supply would not be available as well as the economic impacts associated with lost agricultural opportunities, evaluate the long-term economic impacts associated with this strategy.
- J.4 Assess and evaluate the projected costs associated with providing firm yield supplies to agricultural users over the planning period.
- J.5 Compare and evaluate the estimated economic impacts associated with the use of interruptible supplies to the long-term projected costs associated with providing firm yield supplies to agricultural users.
- K. Identify the important elements and the potential for creation of a water policy for resolving conflicting water demands and the fundamental drought management plan elements required to curtail interruptible supplies during periods of severe drought so that firm water demands can be fully met.
- L. Prepare a draft and final summary report of the potential use of interruptible supplies in Region H outlining the quantified impacts in more detail throughout the planning cycle for interruptible supply strategies in Region H. Identify additional activities and groups which must be included in order to implement such a strategy. The reports will include the following sections: executive summary, purpose of study including how the study supports regional water planning, methodology, results, and recommendations, if applicable. Draft report will be submitted to the planning group and the TWDB for review and comment. All comments will be addressed in the final report. Report will be prepared to include the data and results from each task in the study. The report will be submitted per TWDB requirements and results from this study will be included in the 2011 Region H Regional Water Plan. The development, analysis, and reporting of results will follow methodologies and guidance according to Exhibit B, and agency rules.