

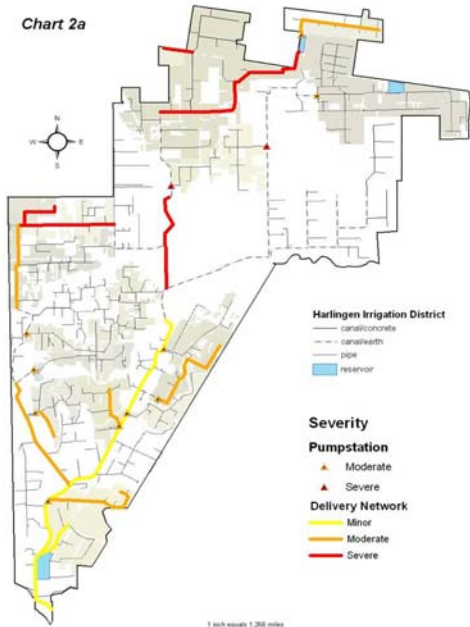
# GIS as a Planning Tool

## Demonstration of the Rapid Assessment Tool (RAT)

The RAT combines field surveys, data collection, mapping and limited direct measurements to provide a quick and cost-effective analysis of conditions of the water distribution network of irrigation districts. The main objective of the **Water Supply (Head) Conditions** component of RAT is designed to define the extent of the area affected and seriousness of the problems contributing to poor conveyance efficiency and low on-farm water use efficiency.

### Severity Canals with Head Problems

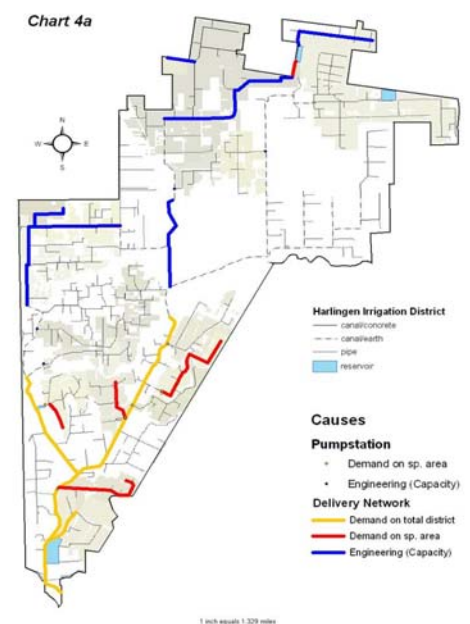
Chart 2a



Harlingen Irrigation District Head Problem Survey Agricultural Engineering, Texas Cooperative Extension Texas A&M University System DMS Team - Jan 2003 <http://dms.tamu.edu>

### Causes Canals with Head Problems

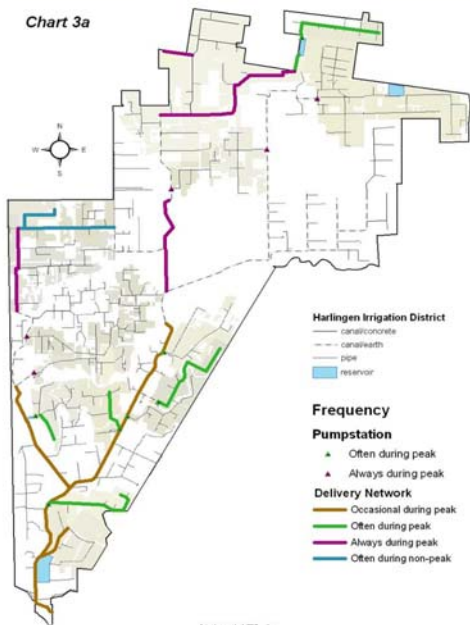
Chart 4a



Harlingen Irrigation District Head Problem Survey Agricultural Engineering, Texas Cooperative Extension Texas A&M University System DMS Team - Jan 2003 <http://dms.tamu.edu>

### Frequency Canals with Head Problems

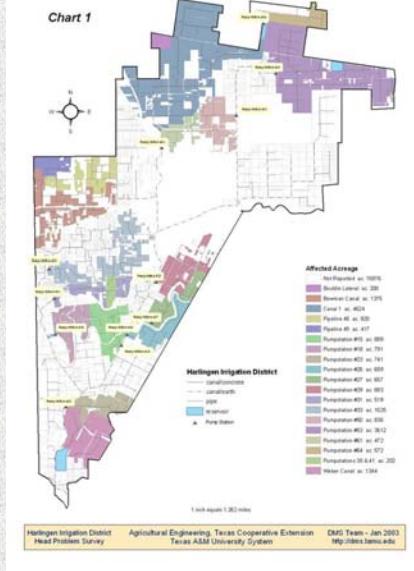
Chart 3a



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### Areas Affected by Head Problems

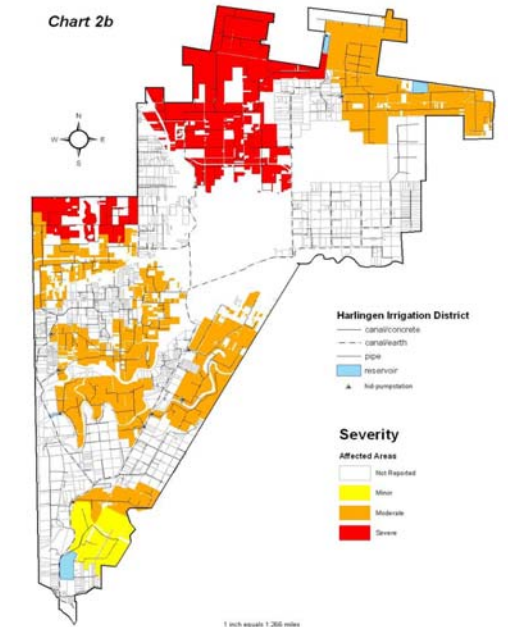
Chart 1



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### Severity Areas (fields) Affected by Head Problems

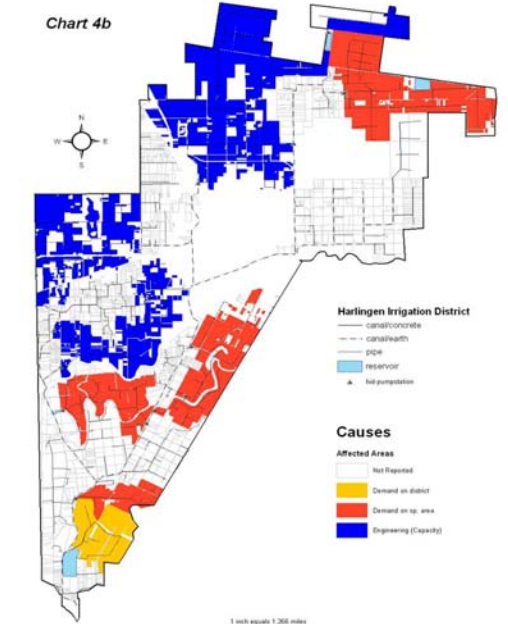
Chart 2b



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### Causes Areas (fields) Affected by Head Problems

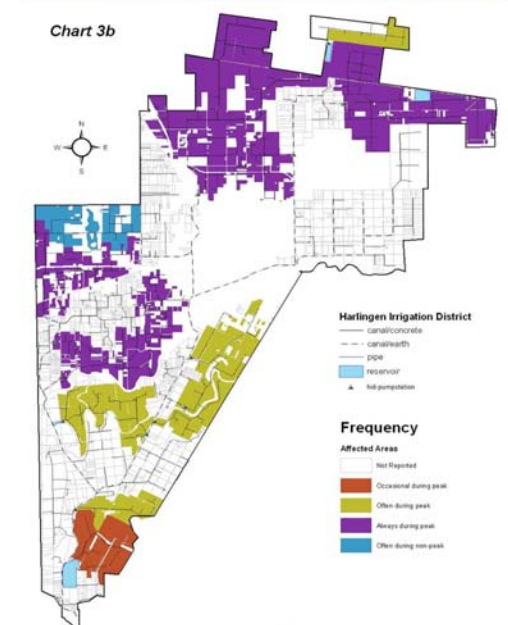
Chart 4b



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### Frequency Areas (fields) Affected by Head Problems

Chart 3b



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### Water Supply (Head) Condition Rating Criteria

- A) Frequency of Head Problem
  - 1) Occasional during peak periods
  - 2) Often during peak periods
  - 3) Occasional during non-peak periods
  - 4) Often during non-peak periods
  - 5) Always during peak periods
  - 6) Never
- B) Cause of Head Problem
  - 1) Heavy demand on the total irrigation district
  - 2) Heavy demand on a certain sections or areas
  - 3) Engineering problem
    - a) Structural problems
    - b) Canal size or capacity
    - c) Slope or elevation
    - d) Fluctuating canal levels
  - 4) Other (i.e. farmer management problem)
- C) Severity of Head Problem
  - 1) Minor
  - 2) Moderate
  - 3) Severe

### Procedures:

District personnel (primarily the canal riders) and DMS Team rate the head conditions of canal segments and pump stations within the district. Segments are evaluated by the criteria. A copy of the rating form provided to district personnel is attached to this report. The DMS Team instructs district personnel on how to complete the form and definition of terms. This includes traveling to the field and joint rating of segments. The DMS Team compiles and analyzes all data and produces maps that interpret the data similar to those provided in this report.

### Results

Head problems affect approximately 21,000 acres in the district.  
**severity:** 6% minor, 59% moderate, 35% severe  
**frequency:** 6% occurs always (non-peak periods) and 94% during peak demand  
**frequency during peak demand:** 7% occasional, 26% often and 67% always

### Causes

**Heavy demand in a certain area** – poor head in 39% of area caused by mismanagement of the system by either the water supplier or the water users on the system  
**Engineering Problems (capacity)** – poor head in 61% of the area is due to:  
 Expansion of irrigated acres (10% of problem), and  
 Changes in crop mix to a larger portion of crops with higher water consumption, such as sugarcane (90% of the problem).