Appendix M: June 21, 2010 Meeting

Agenda

Presentation: Status of Phase 2 Work by David Harkins

Presentation: Socio-economic Impacts by Jack Stowe and Connie Cannady

Presentation: Groundwater in Regions C and D by Robert Mace

Presentation: Land use in the Proposed Marvin Nichols Reservoir Site by Allan Jones

Presentation: Innovative Compensation and Inundation Acreage by Temple McKinnon

Handouts: Timeline for Completion of Activities, Innovative Compensation, Proposed Outline of Draft Report

STUDY COMMISSION ON REGION C WATER SUPPLY

OPEN PUBLIC MEETING

Monday, June 21, 2010
12:30 P.M.
The Meeting will be held at:

Region 8 Education Services Center
2230 N. Edwards
Mt. Pleasant, Texas 75455

AGENDA

I. Call to Order

II. Welcome/Introduction

III. Action Items for Consideration

a. Approval of Minutes of April 26, 2010, Meeting

b. Presentation by David Harkins (Espey Consultants, Inc.) and possible action concerning estimated cost to develop future water supply from Wright Patman Reservoir (Task 1.6)

c. Presentation by David Harkins (Espey Consultants, Inc.) and possible action concerning estimated cost to develop future water supply from Lake O' the Pines Reservoir (Task 1.9)

d. Presentation by Chris Eckert (Jack Stowe & Company) and possible action concerning the socio-economic effects on Region C and on Region D in areas where a water supply is proposed to be located to meet certain water needs in the Region C Water Planning area (Task 2A and 2B)

e. Presentation by Dr. Robert Mace and Temple McKinnon (Texas Water Development Board) and possible action to review the groundwater availability modeling and Desired Future Conditions (DFC) included in the 2010 version of the Region C and Region D Water Plans (Task 1.12)

f. Presentation by Carolyn Brittin (Texas Water Development Board) and possible action to review the methods of compensation that have been considered by the legislature during the 80th and 81st Legislative Sessions related to property owners potentially affected by proposed water management strategies (Task 6.1)

g. Presentation by Carolyn Brittin (Texas Water Development Board) and possible action summarizing the number of surface acres reported in various prior studies as they relate to different dam locations for various water development projects in Region C Water Plan located in Region D (Task 7.1)

h. Presentation by Dr. C. Allan Jones (Texas A & M's Blacklands Research Center) and possible action on aerial imagery obtained for the Marvin Nichols Reservoir site

i. Presentation by Carolyn Brittin (Texas Water Development Board) and possible action concerning a proposed outline and format for the Study Commission's "Report to the 82nd Legislature"

IV. Review and discuss Study Commission Timeline for completing requirements of Section 4.04 of Senate Bill 3 as passed during the 81st Legislative Session

V. Confirm Date, Time, and Location of Next Meeting of Study Commission

VI. Public Comment

VII. Adjourn

Region C Study Commission

Wright Patman and Lake O' the Pines Cost Analysis

David Harkins

Espey Consultants

LAKE WRIGHT PATMAN
Permitted and Contracted Water Rights

- **Permitted Water Rights** –

  Water Authorized for Diversion by Owner
- **Contracted Water Rights** –

  Permitted Water Rights that have been sold or "Contracted" by the Owner
- **Un-Contracted Water Rights** –

  Permitted Water Rights that have **NOT** been sold or "Contracted" by the Owner

LAKE WRIGHT PATMAN
Un-contracted Water Rights (afpy)

City of Texarkana Water Rights	Industrial	Municipal	Total
Permitted Water Rights (afpy)	135,000	45,000	180,000
Contracted Water Rights (afpy)	120,000	2,500	122,500
Remaining for Contract (afpy)	15,000	42,500	**57,500**

Certificate of Adjudication 03-4836

TWDB Study Commission on Region C Water Supply, Phase I Revised Draft Report, 12-08-2009.

LAKE WRIGHT PATMAN
Potentially Available Water (afpy)
From Existing Water Rights Holders

	Industrial	Municipal	Total
Texarkana Permitted Water Rights	135,000	45,000	180,000
Texarkana Un-contracted Water Rights			57,500
Contracted Water Not Used by International Paper Corporation *	77,000		77,000
Potentially Available Water	**92,000**	**42,500**	**134,500**

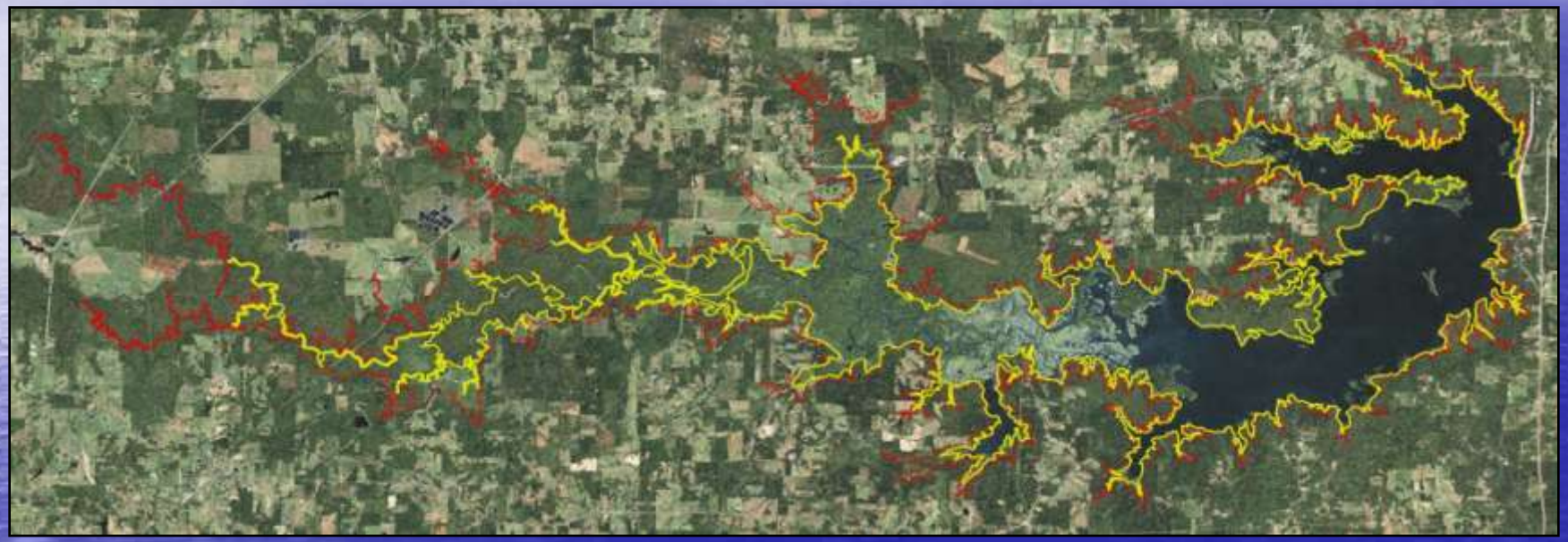
* Based on actual use during period 1994 - 2007. Data provided by International Paper Corporation

LAKE WRIGHT PATMAN
Additional Sources of Water

Additional Yield Gained by System Operation of Lake Wright Patman and Lake Jim Chapman is Estimated to be 108,000 afpy.

Freese and Nichols, Inc., 2003, System Operation Assessment of Lake Wright Patman and Lake Jim Chapman, Volume I Main Report.

Lake Wright Patman Area



Extent at Elevation 230 ft

Extent at Elevation 240 ft

LAKE WRIGHT PATMAN

Expected Yield (afpy) Summary

Top Elev./Bottom Elev.	Total	Available [a]
228.64 Max (flat) / 215.5 Min	363,717 [b]	183,717
230 Max (flat) / 215.5 Min	514,505	334,505
235 Max (flat) / 215.5 Min	671,800	491,800
240 Max (flat) / 215.5 Min	790,800	610,800
Estimated Yield Marvin Nichols	620,000	496,000 [c]

[a] Available Yield of Wright Patman after current 180,000 afpy of Texarkana Water Rights are removed.
[b] Freese and Nichols, Inc., 2003, System Operation Assessment of Lake Wright Patman and Lake Jim Chapman, Volume I.
[C] 80 % of total Marvin Nichols Yield

Lake Wright Patman Costs from 2011 RWP

Owner	Destination	Quantity (ac-ft/year)	Total Cost ($ Millions)	Unit Cost* ($/ac-ft)
DWU	East Side WTP	180,000[a]	$992.3	$562
NTMWD	Lake Lavon	180,000[a]	$905.9	$543
TRWD	Eagle Mountain Lake	180,000[a]	$1,694	$954
Multiple (DWU, NTMWD, TRWD)	Various	390,000[a,b]	$3,085	$851

[a]180,000 ac-ft developed from increase in storage (elevation 228.64 ft)
[b]100,000 ac-ft/year purchased from Texarkana, 108,000 ac-ft/year from system operation with Lake Chapman
*until amortization

Lake Wright-Patman Alternatives 2011 RWP

- Combination of projects
  - 182,000 ac-ft developed from increase in storage (raising conservation pool to elevation 228.64 ft)
  - 100,000 ac-ft/year purchased from Texarkana
  - 108,000 ac-ft/year gained from system operation with Lake Chapman
- Substantial raw water improvement costs ($99.3M) to increase storage
  - Purchase storage and real estate from COE
  - Relocation of existing facilities
  - NEPA evaluation
  - Mitigation

LAKE O' THE PINES
Estimated Available Water (afpy)

Estimate what volume of water is available from Lake O' the Pines including permitted water that has not been contracted below 228.5 feet msl. This will be accomplished through discussions with Northeast Texas Municipal Water District (NETMWD).

Estimate volume of water available from existing water right holders (including contracts that may not be fully utilized)

LAKE O' THE PINES
Un-contracted Water

Available and Contracted Water Rights *	Approximate Water Rights (afpy)
Available Water (Total Firm Yield)	**182,000**
NETMWD Contracted Water	**-148,000**
Available Un-Contracted Permitted Water	**34,000**

* Region D Initially Prepared Water Plan. March 2010

LAKE O' THE PINES
Additional Water Estimates

Potentially Available Water From Existing Water Rights Owners	
NETMWD Member Cities **	36,000
U.S. Steel Corporation **	31,000

** Available through re-negotiated contracts

Total Estimated Potentially Available Water	67,000

LAKE O' THE PINES

Total Additional Water Available (afpy)

Available Contract Water	67,000
Un-contracted Water	34,000
Total	101,000

Lake O' the Pines Routing Alternatives

Lake O' the Pines Cost Comparison

Owner	Destination	Study	Quantity (ac-ft/year)	Total Cost ($ Millions)	Unit Cost* ($/ac-ft)
DWU	East Side WTP	2011 RWP	89,600	$541.5	$705
		EC Phase II	101,000	$589.9	$723
NTMWD	Farmersville WTP (New)	2011 RWP	87,900	$402.4	$576
		EC Phase II	101,000	$496.1	$617
TRWD	Rolling Hills WTP	2011 RWP	87,900	$748.5	$953
		EC Phase II	101,000	$820.2	$981

QUESTIONS ?

Study Commission on Region C Water Supply

SB 3 - Socioeconomic Effects
Study Tasks 2A and 2B

Mr. Jack Stowe, President, J. Stowe & Co.
Ms. Connie Cannady, Manager, J. Stowe & Co.

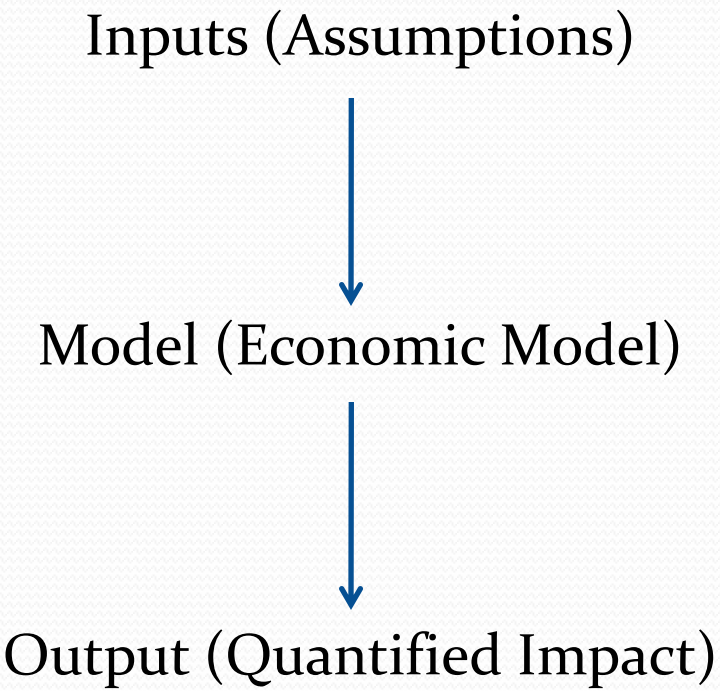
J STOWE & CO

Socioeconomic Tasks - Phase I Study Efforts

- Phase I Goals:
  - Review available literature
  - Determine methodology used and identify the “gaps” between the studies
  - Provide recommendations as to how to bridge those gaps

- Key Question for Phase I:
  - How can two studies using similar methodologies produce different results and how can this be avoided?

Elements of Socioeconomic Impact Analysis



Gaps Identified

- Consistency
  - Lack of consistency in methods, assumptions used, impacts quantified, application of economic model and use of results
  - Only consistency is actual use of IMPLAN Economic Model
- Focus
  - Studies appear to be focused based on the entity / organization that commissioned the study
  - Some studies are narrowly focused / some broadly focused
  - Some focus only on negative impacts, others on all impacts
  - Leads to inconsistent results

Gaps Identified

- Assumptions
  - Variation in assumptions leads to inconsistencies
  - Selective use of assumptions drives focus
- Lack of Data
  - No data available or studies compiled for Wright Patman Lake or Lake O' the Pines

Key Questions from SB 3

- What is the impact on the basin of origin for water supplies used to meet the needs of Region C, specifically, what is the economic impact on:
  - Landowners
  - Agricultural and Natural Resources
  - Business and Industry
  - Taxing Entities

- In connection with water use from Wright Patman Lake, the effect on water availability in that lake and the effect on industries relying on that water availability

Key Economic Terms

- Multiplicative Effect – The total economic response to a change in demand or production
- Direct Effects – A change in an industry that has a direct economic impact
- Indirect Effects – A change to a secondary industry due to a direct effect
- Induced Effects – An economic change in household spending due to a direct or indirect effect

Impact to Landowners

- To the extent a landowner derives income from land (i.e., agricultural / mineral extraction), the negative economic impact is considered an induced effect of the loss of the industry
- Assuming sufficient and adequate compensation (i.e., landowner is "made whole"), the creation or use of an existing water supply to meet the needs of Region C does not create a negative economic impact on landowners.
  - Does not offset negative social impacts

Impact on Agricultural and Natural Resources

- Loss of agricultural and natural resources can occur through the establishment of a water supply alternative or the taking of land for mitigation. May also be impacted by a decrease in available water supply.

- To the extent that resources are materials used in industrial production or commercial transactions, then the direct, indirect, and induced effects can be determined and quantified

Impacts to Business and Industry

- Impacts to business and industrial facilities in basin of origin from loss of materials or reduction in production due to decreased availability or loss of water supply is easily quantifiable using IMPLAN software
- Direct impact is calculated and modeled to further determine indirect and induced impacts
- Loss of one industry or commercial activity can create opportunities for new industry or commercial (i.e., loss of area to reservoir creation can result in commercial opportunities associated with recreation)

Impact on Taxing Entities

- The loss of taxable land to the creation of a water supply alternative, or the loss of taxes from decreased commercial or industrial output may have an impact on a local taxing authority
  - A loss of one type of industry or commercial activity could result in the creation of an alternative which could offset taxing impact
- Government expenditure of tax dollars has a direct economic impact through the transfer of dollars from households
- Total impact is dependant on Government's decision to recoup lost tax revenues

Key Questions from SB 3 – Wright Patman

- In connection with water use from Wright Patman Lake, the effect on water availability in that lake and the effect on industries relying on that water availability
- Three Potential Water Supply Strategies:
  - Voluntary Redistribution of Water Resources
  - Reallocation of Reservoir Storage
  - Reservoir System Operation
- Region C Water Plan Currently states 100,000 afpy is available from Wright Patman
  - Texarkana's Contract with International Paper (IP) would need to be modified to create available supply above 57,000 afpy

Impact of Wright Patman Lake Alternatives

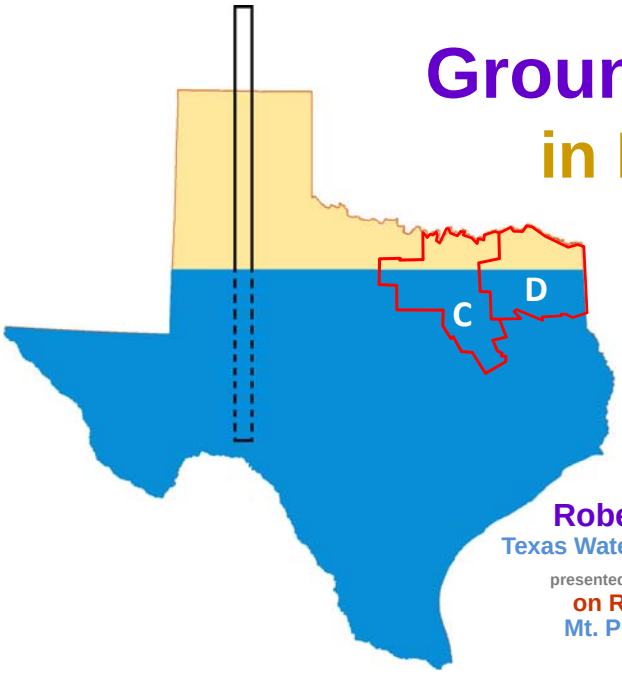
- Impact of Voluntary Redistribution
  - Assuming only unused water is redistributed, no known quantifiable impacts
  - Impact could exist should future industries or IP require greater water supplies than available after use by Region C
  - Determination of future potential use is needed to ensure future growth is not impacted
- Impact of Reallocation of Reservoir Storage
  - Potential impacts to the White Oak Creek Wildlife Management Area – may require additional mitigation areas
  - Potential need to adjust intake and/or pumping facilities of Texarkana or IP
- Reservoir System operation
  - Would require easements for piping and pumping facilities, minimal impact from loss of productive land

How to Bridge Identified Gaps

- Conduct initial, formal studies of Wright Patman Lake and Lake O' the Pines
  - Proposed Feasibility Study of the Sulphur River Basin could provide valuable information which could be beneficial in conducting future analysis
- Develop specific and/or recommended techniques or guidelines for conducting future socioeconomic impact analysis
  - Once developed, update analysis of Marvin Nichols utilizing guidelines and updated dam site

Questions and/or Comments

Mr. Jack Stowe, President, J. Stowe & Co.
Ms. Connie Cannady, Manager, J. Stowe & Co.
1300 E. Lookout Dr., Ste. 100
Richardson, Texas 75082
P 972.680.2000
jstowe@jstoweco.com



Groundwater in Regions C & D

Robert E. Mace, Ph.D., P.G.
Texas Water Development Board

presented to: **Study Commission on Region C Water Supply**
Mt. Pleasant, June 21, 2010

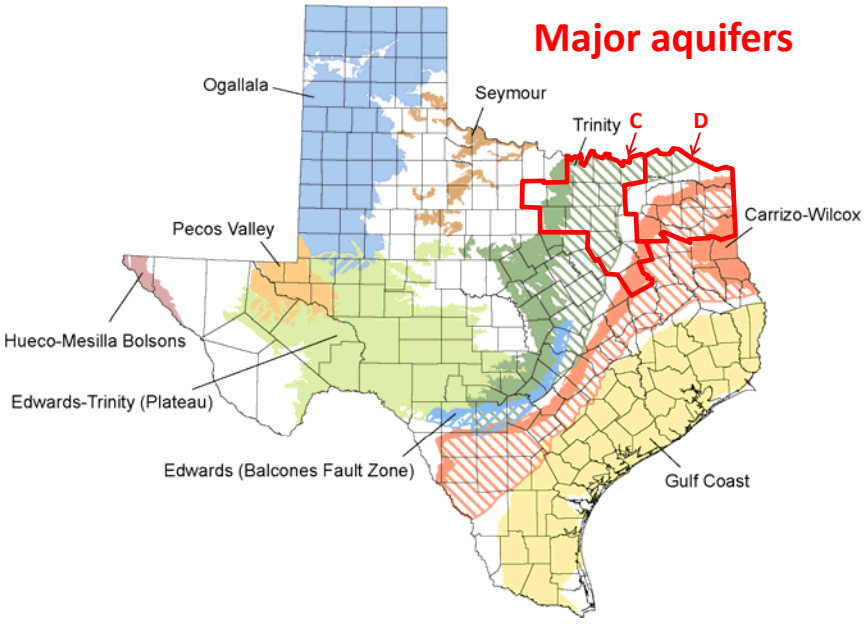
Outline

- Aquifers in C & D
- Groundwater availability and modeling
- Desired future conditions
- Groundwater availability in Regions C & D

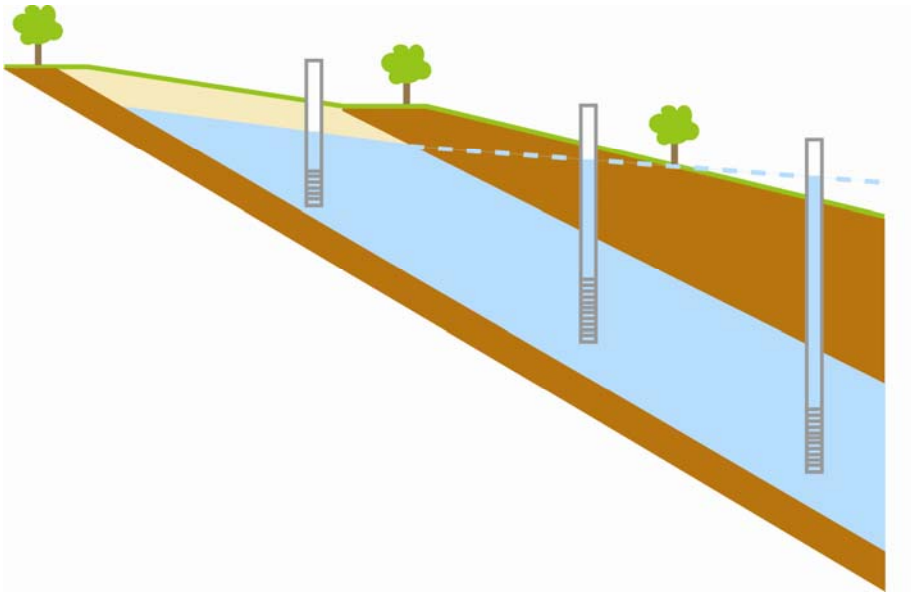
Outline

- **Aquifers in C & D**
- Groundwater availability and modeling
- Desired future conditions
- Groundwater availability in Regions C & D

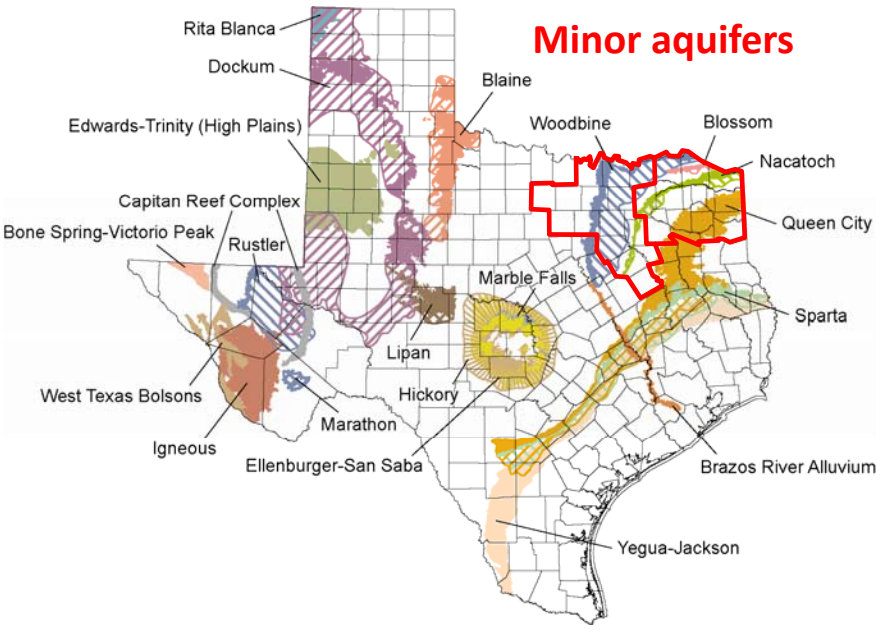
Major aquifers



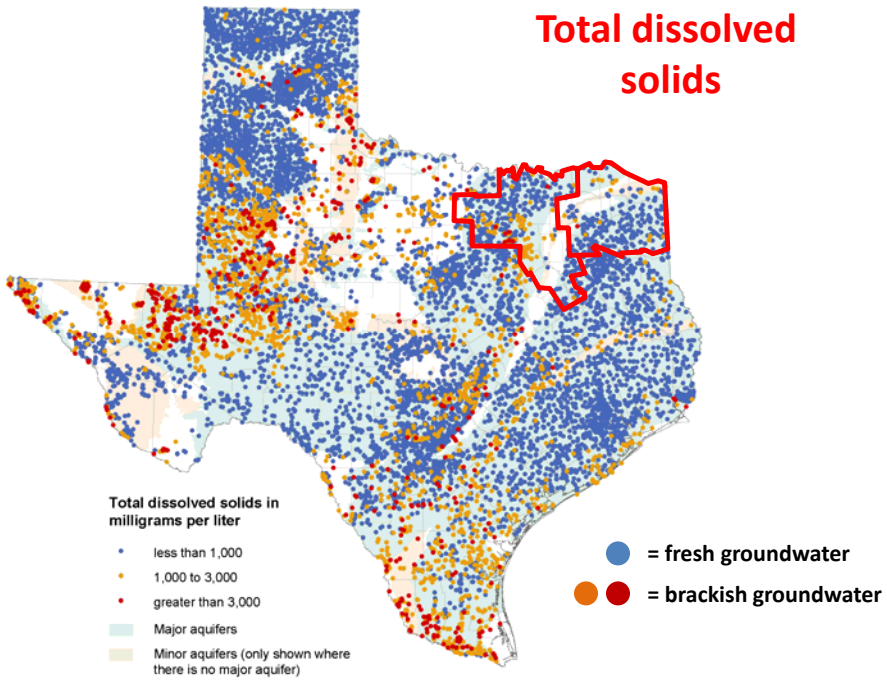
"Dipping" Aquifers

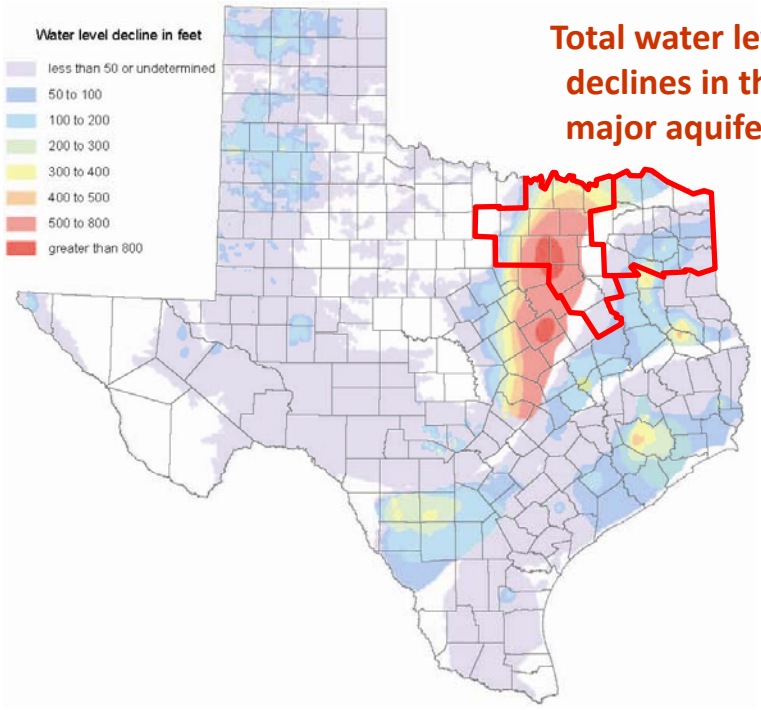


Minor aquifers



Sandstone


Total dissolved solids
Total dissolved solids in milligrams per liter
less than 1,000
1,000 to 3,000
greater than 3,000
Major aquifers
Minor aquifers (only shown where there is no major aquifer)
= fresh groundwater
= brackish groundwater



Total water level declines in the major aquifers

Outline

- Aquifers in C & D
- **Groundwater availability and modeling**
- Desired future conditions
- Groundwater availability in Regions C & D

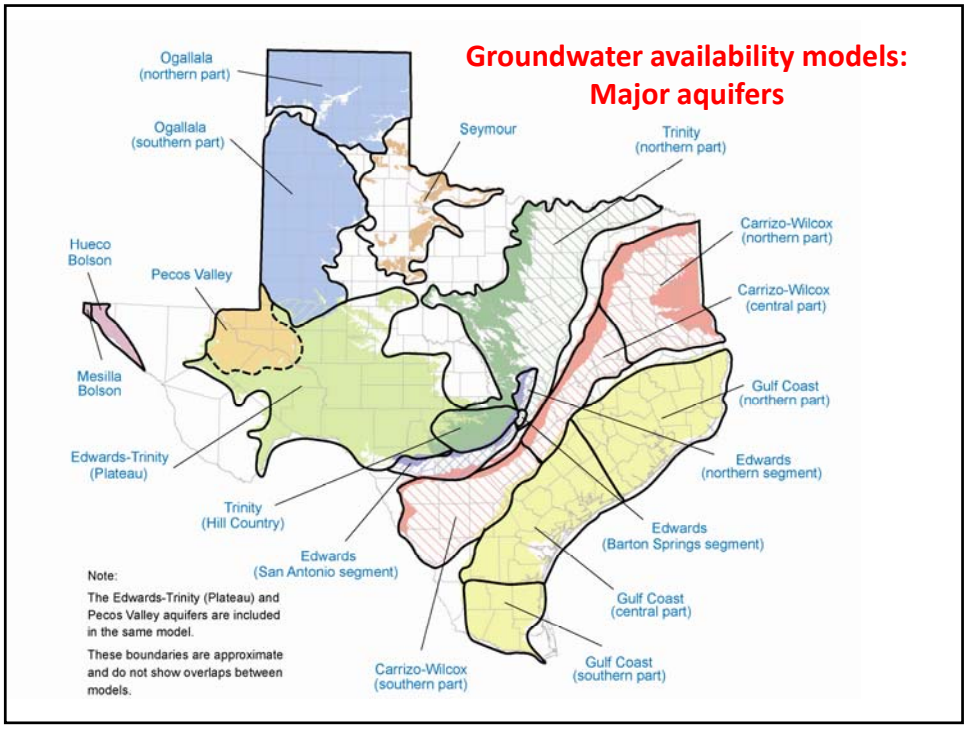

(policy) +

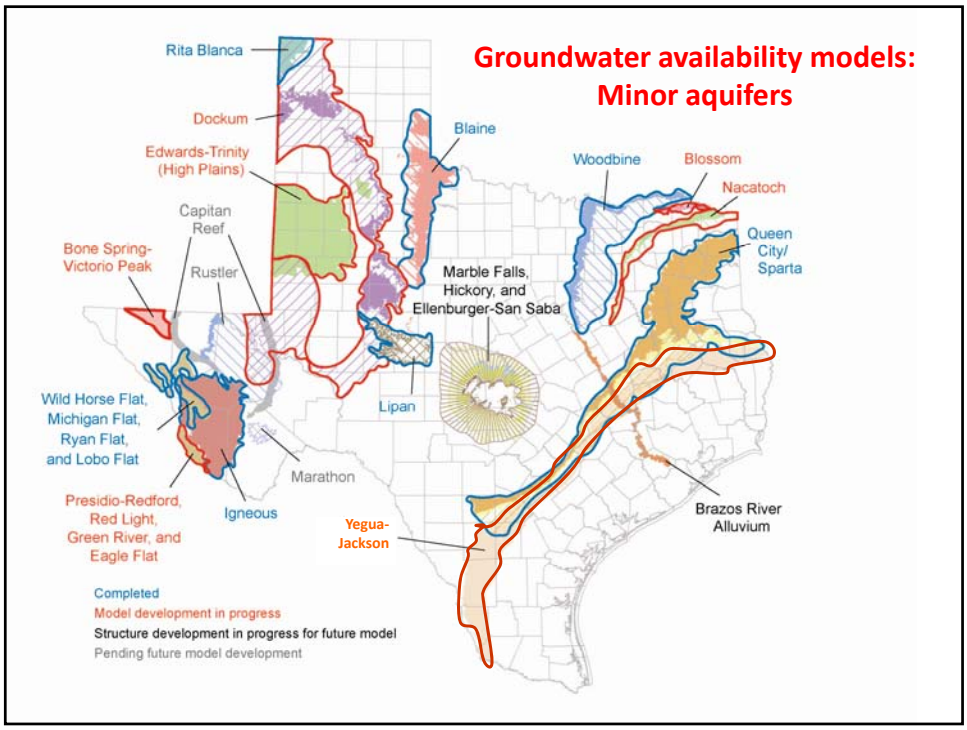
(science) =

groundwater availability

What is a Numerical Groundwater Flow Model?

- **'The aquifer in a computer!'**

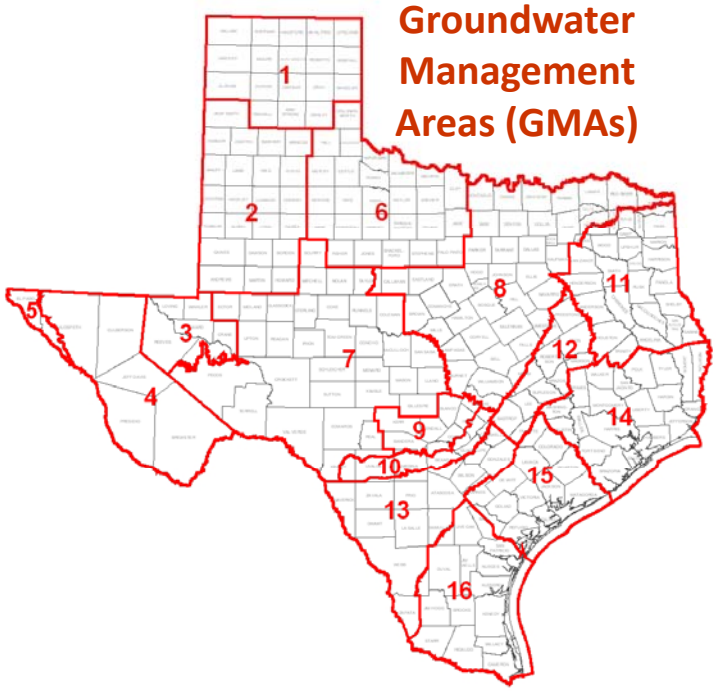

Groundwater availability models:
Major aquifers
Ogallala
(northern part)
Ogallala
(southern part)
Seymour
Trinity
(northern part)
Carrizo-Wilcox
(northern part)
Carrizo-Wilcox
(central part)
Hueco
Bolson
Pecos Valley
Mesilla
Bolson
Gulf Coast
(northern part)
Edwards-Trinity
(Plateau)
Edwards
(northern segment)
Trinity
(Hill Country)
Edwards
(Barton Springs segment)
Edwards
(San Antonio segment)
Gulf Coast
(central part)
Carrizo-Wilcox
(southern part)
Gulf Coast
(southern part)
Note:
The Edwards-Trinity (Plateau) and Pecos Valley aquifers are included in the same model.
These boundaries are approximate and do not show overlaps between models.

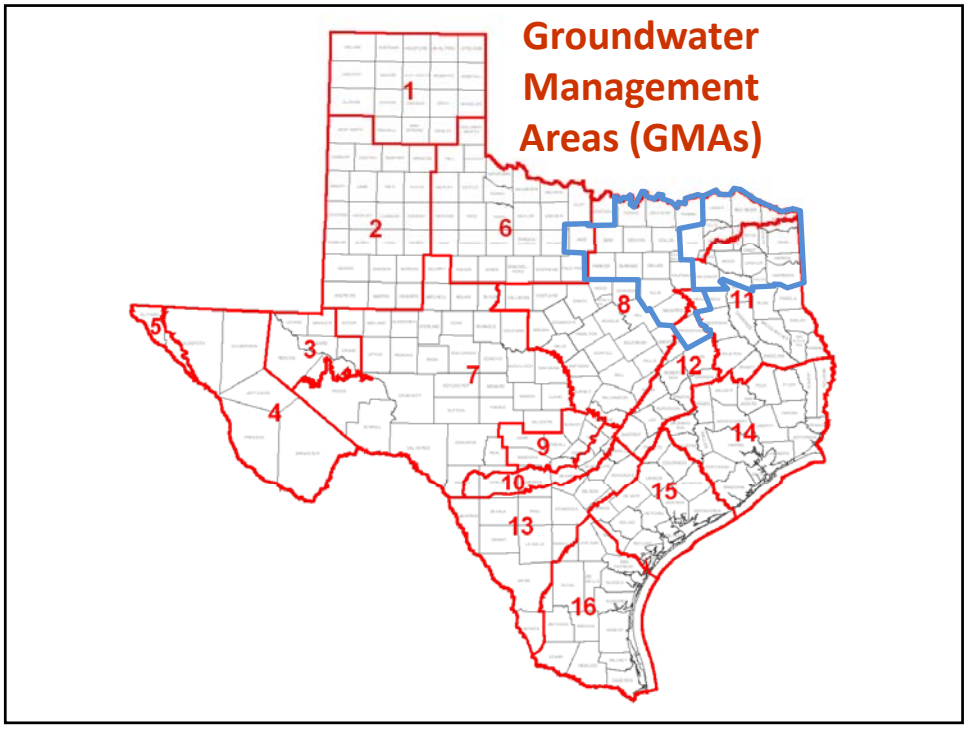

Groundwater availability models:
Minor aquifers
Rita Blanca
Dockum
Blaine
Edwards-Trinity
(High Plains)
Woodbine
Blossom
Nacatoch
Capitan
Reef
Queen
City/
Sparta
Bone Spring-
Victorio Peak
Rustler
Marble Falls,
Hickory, and
Ellenburger-San Saba
Wild Horse Flat,
Michigan Flat,
Ryan Flat,
and Lobo Flat
Lipan
Marathon
Presidio-Redford,
Red Light,
Green River, and
Eagle Flat
Igneous
Yegua-
Jackson
Brazos River
Alluvium
Completed
Model development in progress
Structure development in progress for future model
Pending future model development

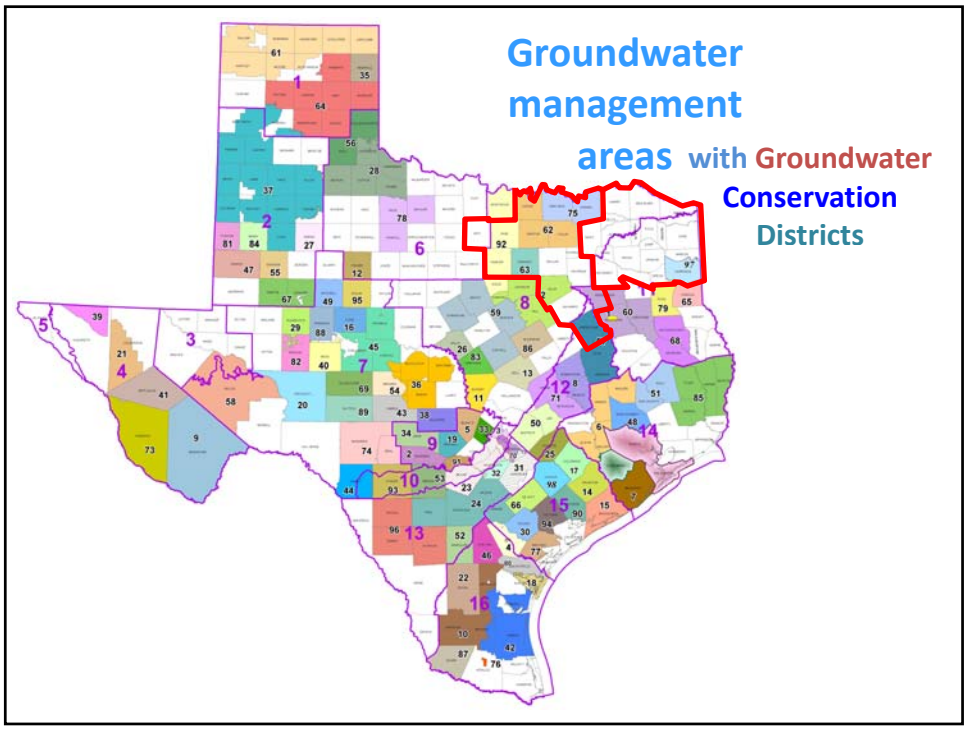
Outline

- Aquifers in C & D
- Groundwater availability and modeling
- **Desired future conditions**
- Groundwater availability in Regions C & D

Groundwater Management Areas (GMAs)




Groundwater
Management
Areas (GMAs)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


Groundwater
management
areas with Groundwater
Conservation
Districts

Districts in GMAs
decide Desired Future Conditions
and deliver to TWDB

TWDB provides estimates
of Managed Available Groundwater
to districts and regions

Districts and regions include
Managed Available Groundwater
in plans

(policy) + (science) = groundwater availability

desired future conditions

managed available groundwater

permitting and planning

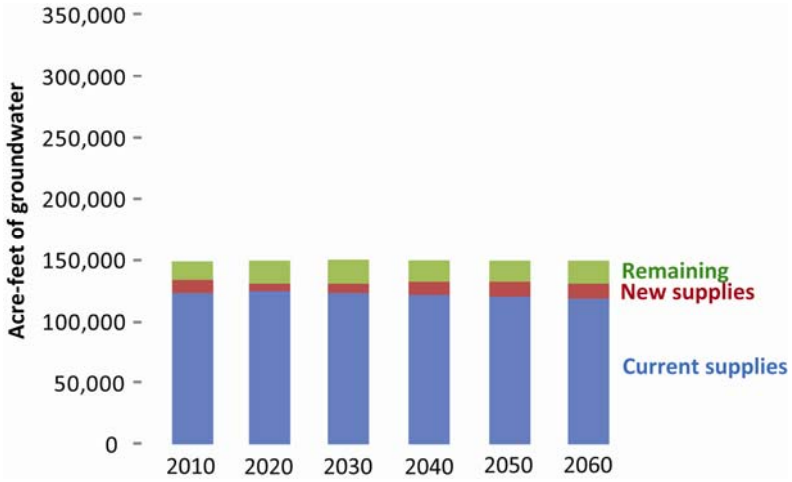
Desired Future Conditions:

- **Statutory deadline: September 1, 2010**
- **Not in regional or state water plans unless earlier deadlines were met**

Outline

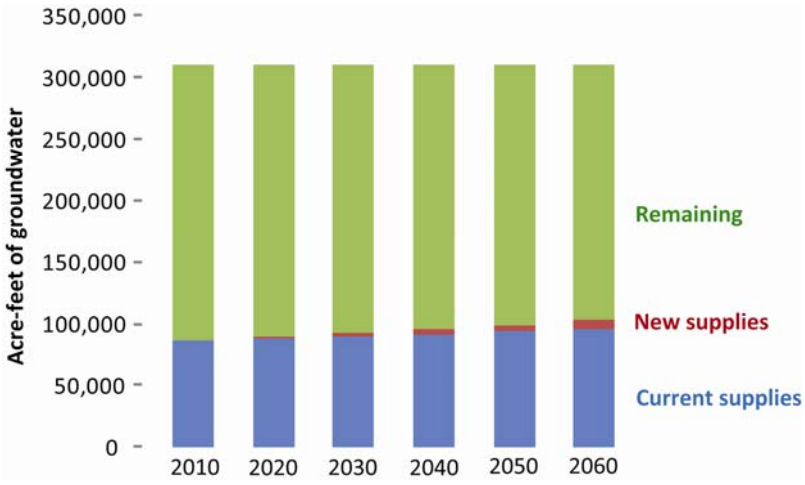
- Aquifers in C & D
- Groundwater availability and modeling
- Desired future conditions
- **Groundwater availability in Regions C & D**

Groundwater Availability and Supplies in Region C



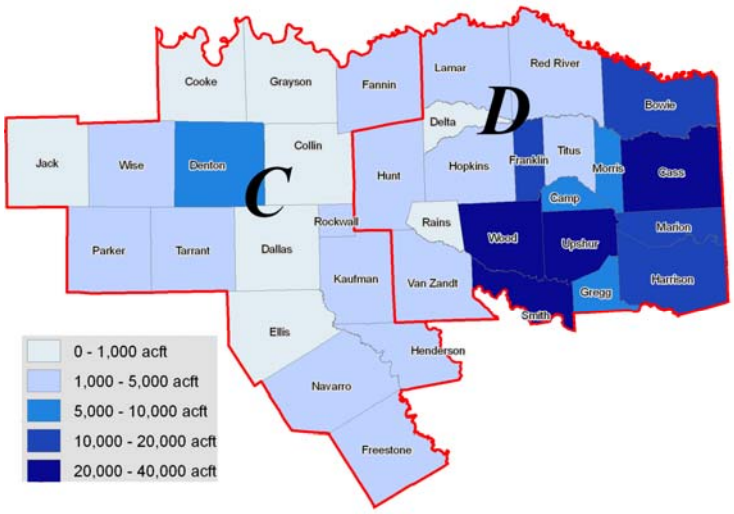
Data from 2010 Initially Prepared Plans

Groundwater Availability and Supplies in Region D



Data from 2010 Initially Prepared Plans

Distribution of Remaining Groundwater



More about groundwater in Texas

Groundwater in Texas:

www.twdb.state.tx.us/groundwater

Robert E. Mace:

(512) 936-0861

robert.mace@twdb.state.tx.us


TEXAS WATER DEVELOPMENT BOARD

Land Cover/Use Change Detection Using SPOT 5 & LIDAR Imagery for the Proposed Marvin Nichols Reservoir Site in North East Texas

Zach Vernon and
Dr. Raghavan Srinivasan
Texas A&M University
Spatial Sciences Lab
October 18, 2007

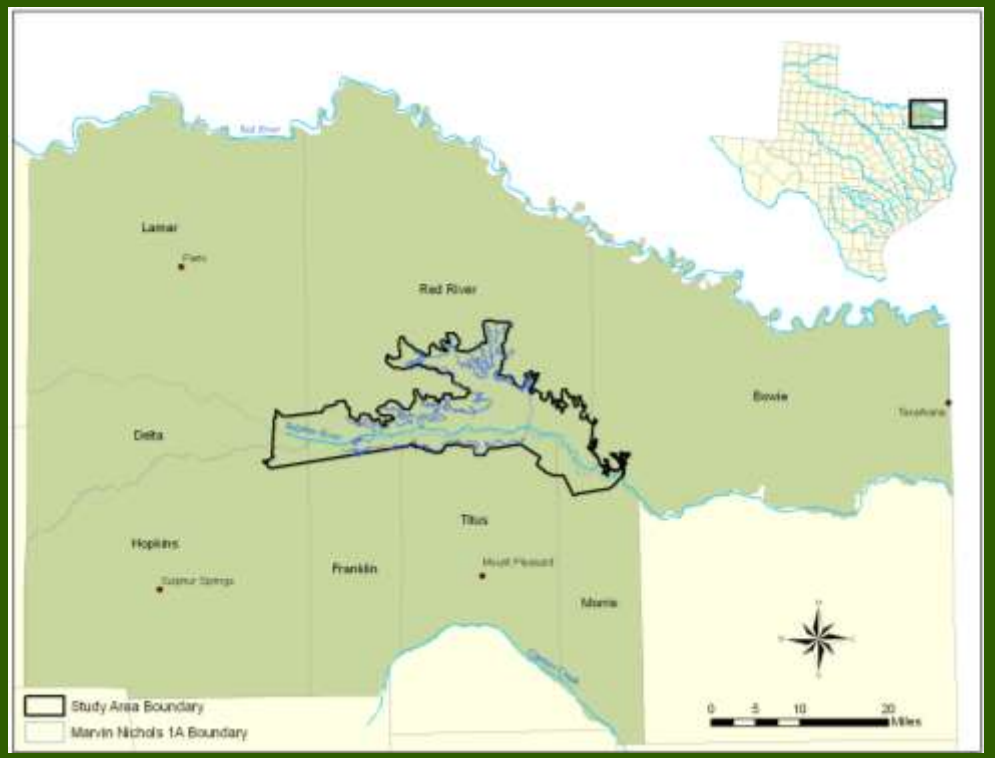
Photos from study area by Zach Vernon or Martin Gibson; Feb 16 – Feb 20, 2007

Objectives

- Derive the status of Land Cover/Use (LC/LU) across a section of the Sulphur River Basin using data from 2005
- Detect changes in LC/LU from 1974-2005

Background

- Sulphur River Basin in northeast Texas
  - Contains large portion of remaining bottomland hardwood forests in TX
  - Location of the proposed Marvin Nichols Reservoir
  - Study area approx. 184,415 acres
  - Reservoir boundary approx. 65,029 acres

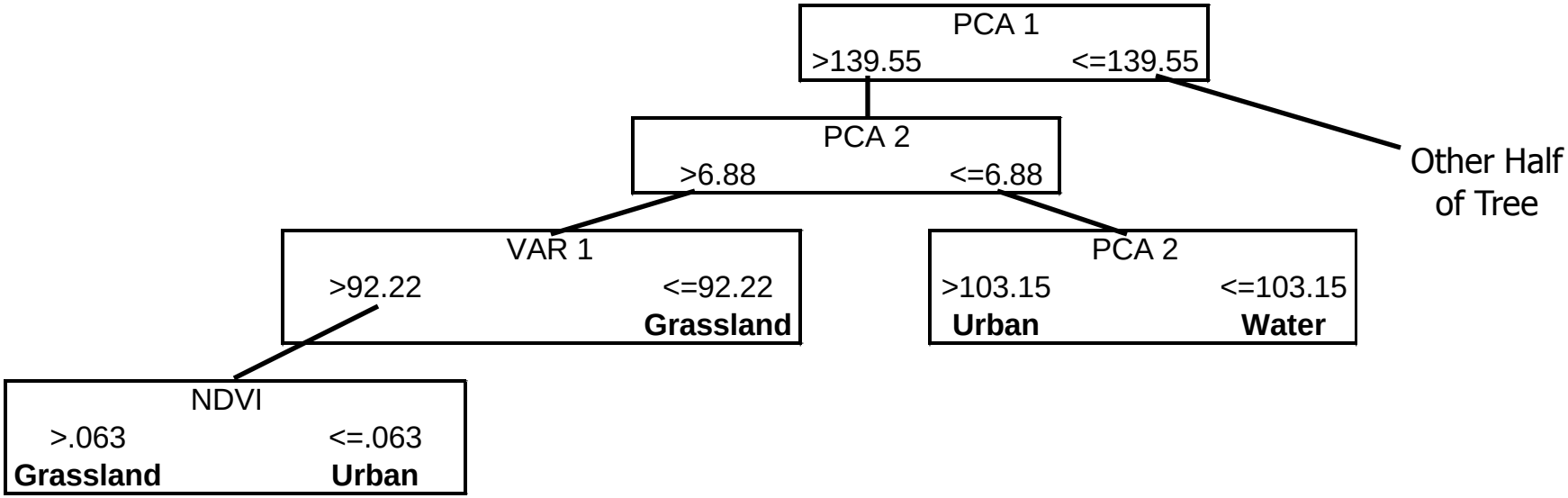


Study Area and Reservoir Boundary

Background

- Classifications of forested wetland systems often involve difficult-to-separate classes (Sivanpillai et al., 2000; FGDC, 2007).
- Assessed various classification inputs and approaches
- Reliable map of land cover in the area will:
  - Provide insight into function
  - Facilitate comparison to previous years
  - Aid mitigation efforts

Background: Image Classification



- Rule-based methods are an innovative new approach
  - Classify a pixel based on a hierarchical series of decisions

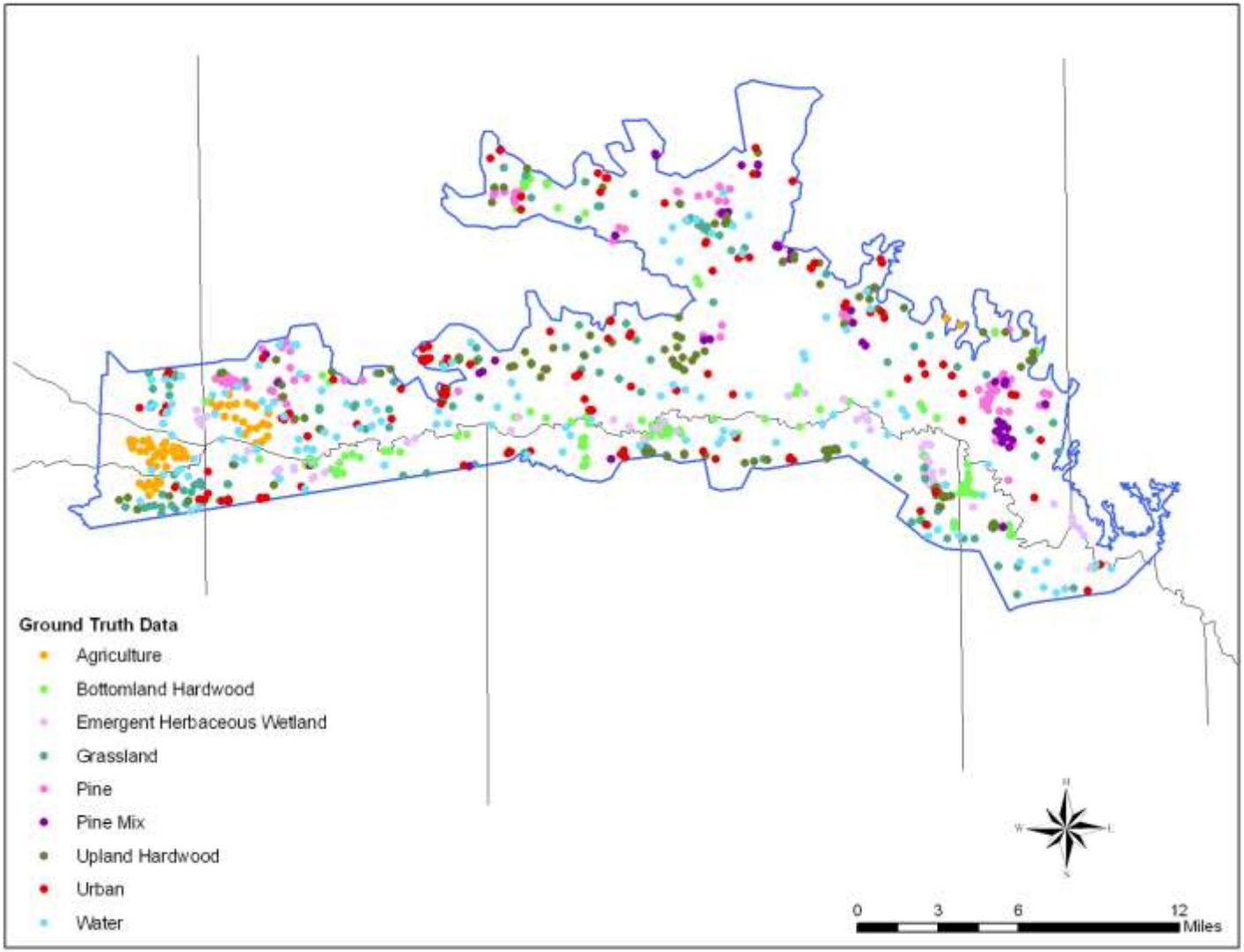
Background on Previous Classifications

- 1997 study by Liu *et al.* for Texas Parks & Wildlife Dept
  - Analyzed land cover at three proposed reservoir sites in Northeast Texas
  - Used Landsat TM (30 X 30 resolution) imagery from June 1994
  - Detected nine classes at the site
  - No accuracy assessment performed for the classification
- 2000 study by the Texas A&M Spatial Sciences Lab
  - Analyzed land cover across a nine-county region in Northeast Texas
  - Used Landsat TM data from May 1997 & Landsat MSS Data (60 X 60 resolution) for June/October 1974, June/July 1984, and June/October 1991
  - Detected nine classes for the 1997 classification and six classes for all others
  - 79% accuracy achieved across nine-county region for 1997 classification

Materials and Methods: Classes

1. **Water** - areas of open water, generally with less than 25% cover of vegetation or soil.
2. **Pine -** areas dominated by trees where 75% or more of the canopy cover can be determined to be trees which maintain their leaves all year. Dominant tree species include loblolly, shortleaf, and slash pine.
3. **Pine Mix -** areas dominated by trees where neither deciduous nor evergreen species represent more than 75% of the canopy cover. This type includes a mixture of pines, as well as other softwoods, and hardwood species including oak, hickory, and others.
4. **Upland Hardwood** - areas dominated by trees where 75% or more of the canopy cover can be determined to be trees which lose all their leaves for a specific season of the year. The soils are well-drained, and this cover type occurs outside the floodplain. Tree species include post oak, blackjack oak, black hickory and winged elm.
5. **Bottomland Hardwood** - areas dominated by woody vegetation where the water table is at, near, or above the land surface for a significant part of most years and vegetation indicative of this covers more than 25% of the land surface. Includes seasonally flooded bottomland and wooded swamps. Species include water oak, willow oak, blackgum, American elm, green ash, and Chinese tallow.
6. **Grassland -** areas dominated by true grasses and broad-leaved herbaceous plants. Less than 25% tree cover is present. The class includes pastures and natural grasslands.
7. **Agriculture –** areas where a majority of vegetation is planted and/or maintained for the production of food, feed, fiber, pasture, or seed. Due to timing of image acquisition, this type primarily includes plowed fields of exposed soil.
8. **Emergent Herbaceous Wetland/Secondary Bottomland Hardwood** – areas in the floodplain dominated by wetland herbaceous vegetation which is present for most of the growing season, frequently flooded grasslands, and areas that are likely successional to the bottomland hardwood class, such as areas that have been logged where natural regeneration is occurring.
9. **Urban/Other** – area containing >30% constructed materials or areas containing bare rock, gravel, or other earthen material where no vegetation is present.

(Liu *et al.*, 1997; The Interagency LULC Working Group, 1999; Sivanpillai *et al.*, 2000).



- Ground Truth Data
  - 519 GPS points collected 02-16-07 to 02-20-07
  - Additional sampling via ArcGIS, bringing total to 881 points

Materials and Methods: Datasets

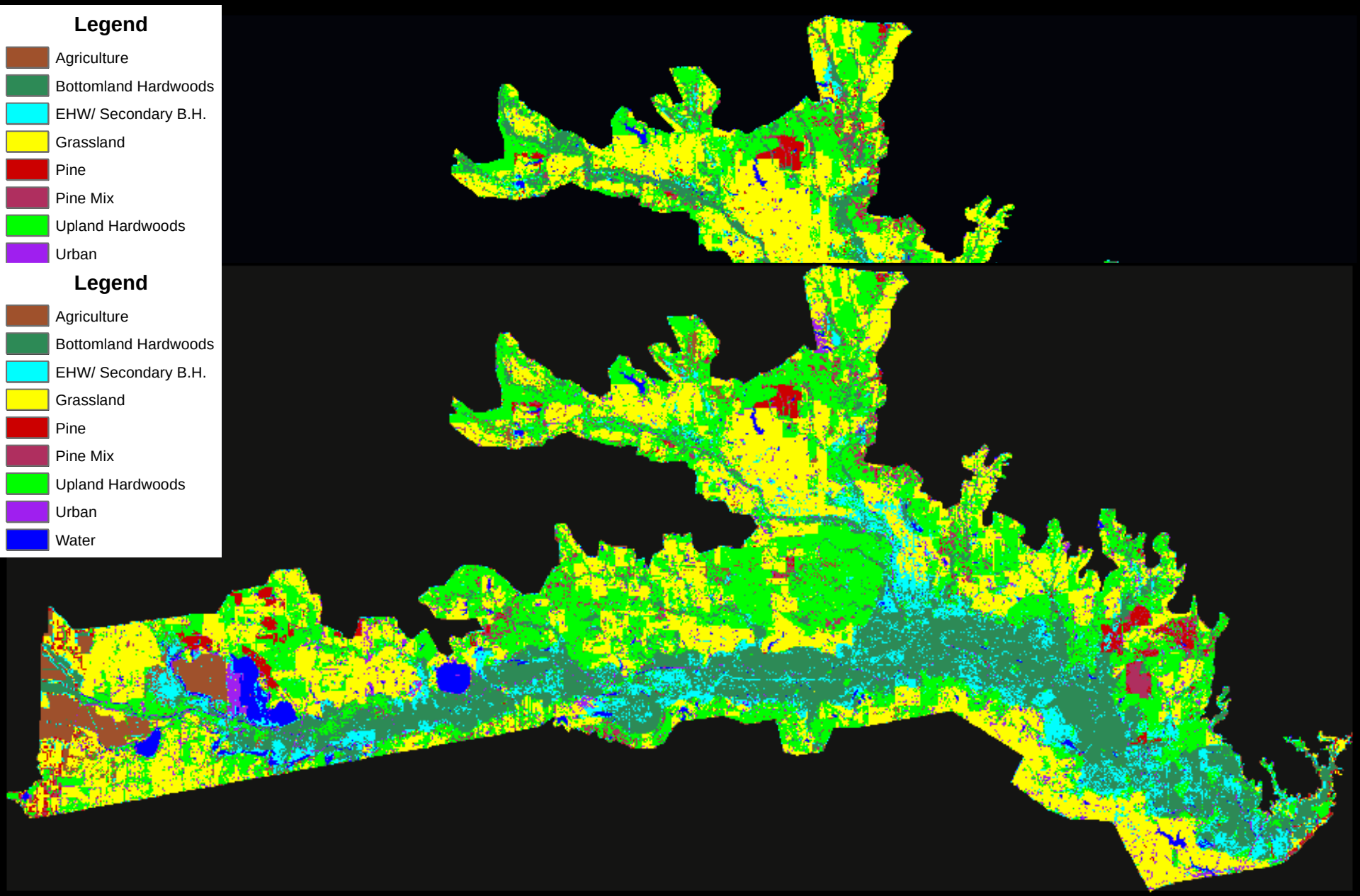
- NAIP digital ortho-photos (2m resolution) - Growing season of '05
  - USDA Farm Services Agency
  - Single PCA band & 3 original bands – R, G, B
- National Hydrography Dataset (NHD)
  - USGS and EPA
  - Continuous "distance-to-flooding" grid
- Soil Survey Geographic (SSURGO) data
  - Natural Resources Conservation Service
  - Percent hydric soils
- NWI/NLCD wetlands data
  - US FWS and MRLC Consortium
  - 0/1 documented wetlands layer

Methods: Pixel-based classification

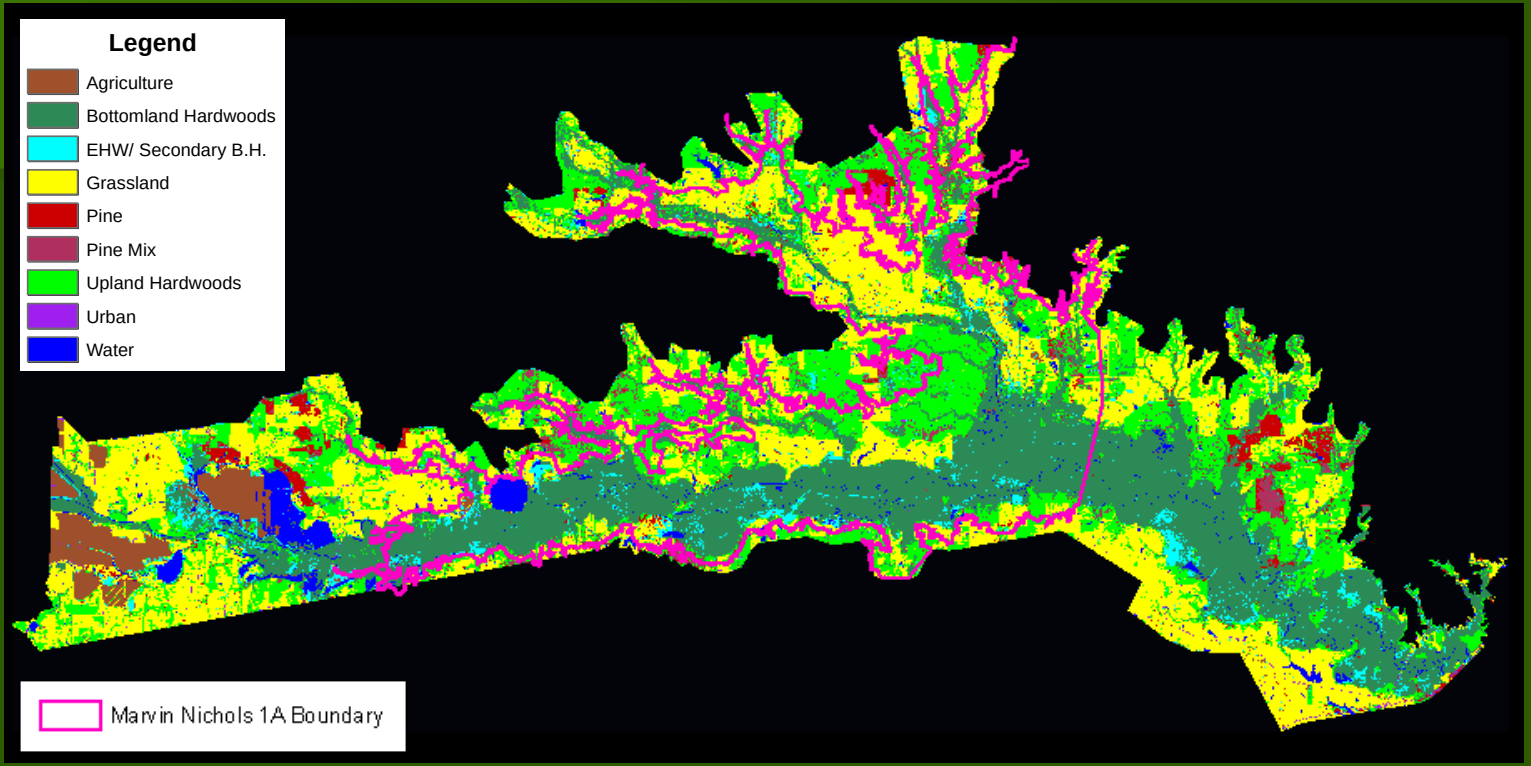
- Points divided into training vs. accuracy
  - Randomly divided, omitting approx. 150 potentially "confusing" points
  - 30% of full count of points held aside for training, remaining points, including the "confusing" subset were set aside for accuracy assessment
- Supervised classifications performed using Maximum Likelihood Classification method
  - Tested various band combinations to determine ideal inputs
- Unsupervised classifications also performed

Methods: Rule-Based Classification

- Classification and Regression Tree (CART) Module for ERDAS Imagine
  - Developed input files for See5
  - Performed classification using See5 decision trees
- See5 data mining software
  - Developed 20 "boosted" and "pruned" decision trees using 400 randomly selected training samples
- 3X3 Majority Filter applied to best pixel-based and best rule-based output
- Portions of area not covered by primary SPOT scenes were manually delineated and merged to central classification


Legend
Agriculture
Bottomland Hardwoods
EHW/ Secondary B.H.
Grassland
Pine
Pine Mix
Upland Hardwoods
Urban
Legend
Agriculture
Bottomland Hardwoods
EHW/ Secondary B.H.
Grassland
Pine
Pine Mix
Upland Hardwoods
Urban
Water

Results and Discussion: Rule-Based



	LC/LU class	Hectares	%
1	Agriculture	2,123.63	2.85
2	Bottomland Hardwood	20,809.31	27.91
3	EHW/Secondary Bottomland Hardwood	2,644.70	3.55
4	Grassland	22,906.39	30.72
5	Pine	1,785.86	2.40
6	Pine Mix	1,808.25	2.43
7	Upland Hardwood	19,644.75	26.35
8	Urban/Other	367.21	0.49
9	Water	2,475.70	3.32
Total Area		74,565.80	100.00

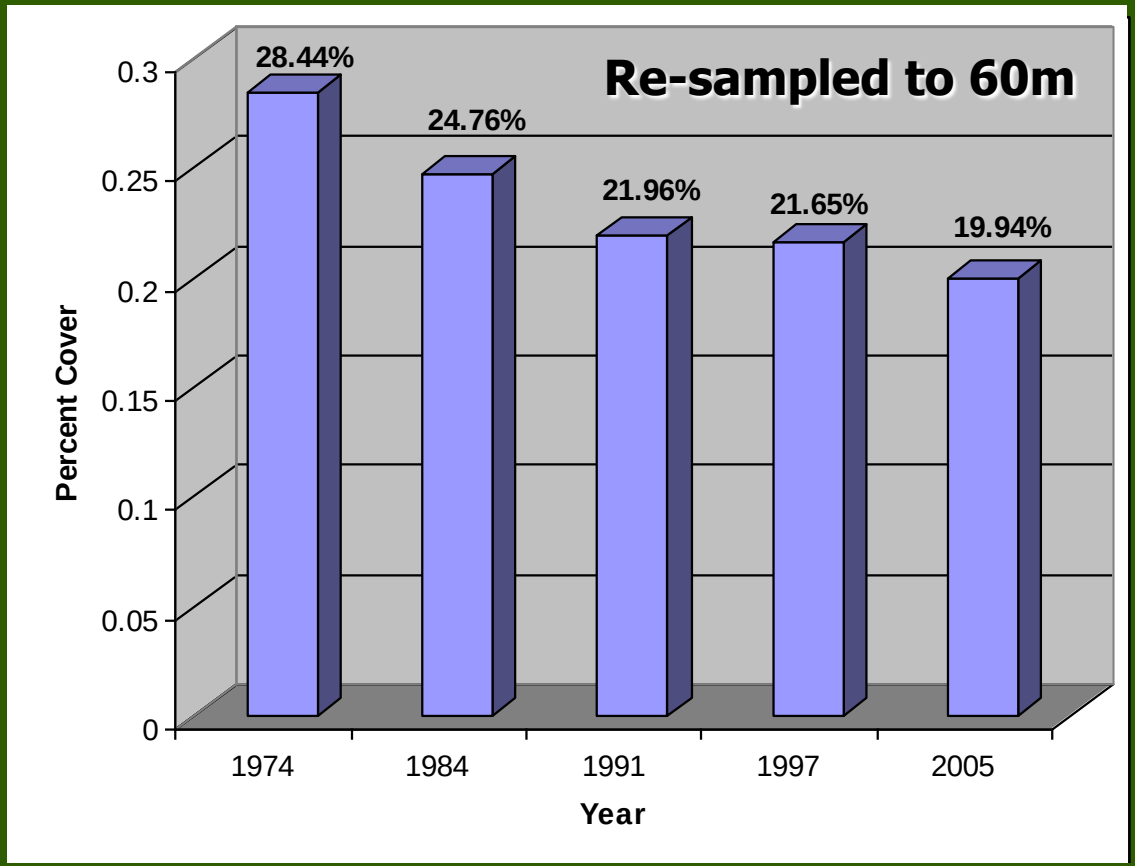
Full Study Area

	LC/LU class	Hectares	%
1	Agriculture	149.24	0.57
2	Bottomland Hardwood	10,870.84	41.49
3	EHW/Secondary Bottomland Hardwood	1,085.36	4.14
4	Grassland	6,599.17	25.19
5	Pine	306.49	1.17
6	Pine Mix	581.20	2.22
7	Upland Hardwood	5,811.90	22.18
8	Urban/Other	69.90	0.27
9	Water	725.66	2.77
Total Area		26,199.75	100.00

Marvin Nichols 1A

Results and Discussion: Comparison to Previous Classifications

- General trend visible from 1974 to 1991, when inputs and class definitions were identical
- Levels off from 1991-1997, and increases from 1998-2005
- Trend not evident if re-sampled
- Changes in class area occur for several reasons related to improvements in methodology



Change in Bottomland Hardwoods
(Fraction of Total Area)

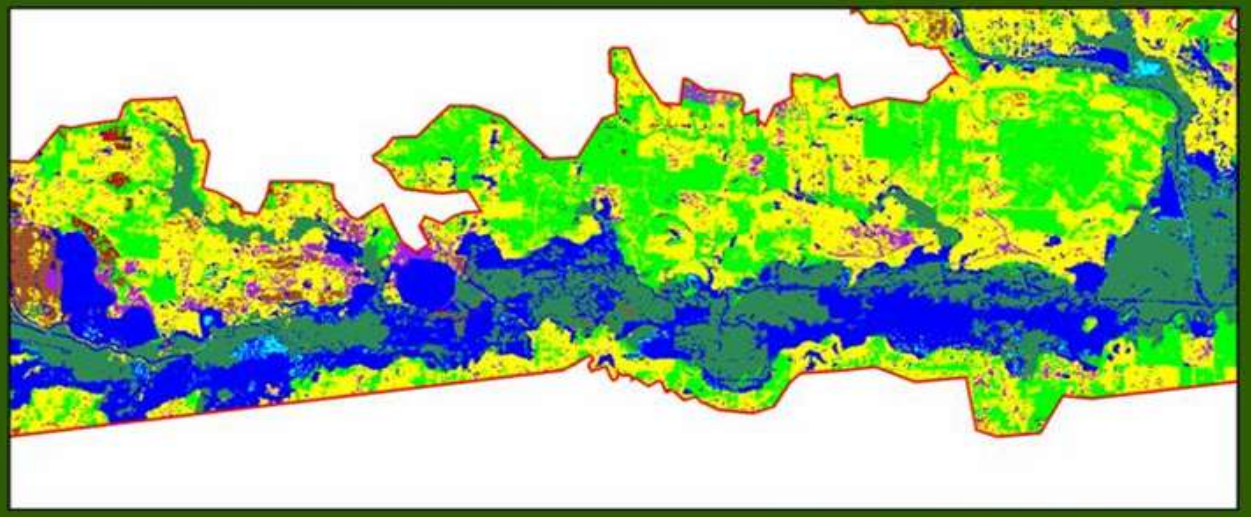
Results and Discussion: Comparison to Previous Classifications

- Differences in the timing of source image acquisition
- Differences in resolution of source imagery
- Size of Study Area
- Improvements in input data and methodology
  - Valuable additional inputs
  - Improved classification methods
  - Differences in class definitions

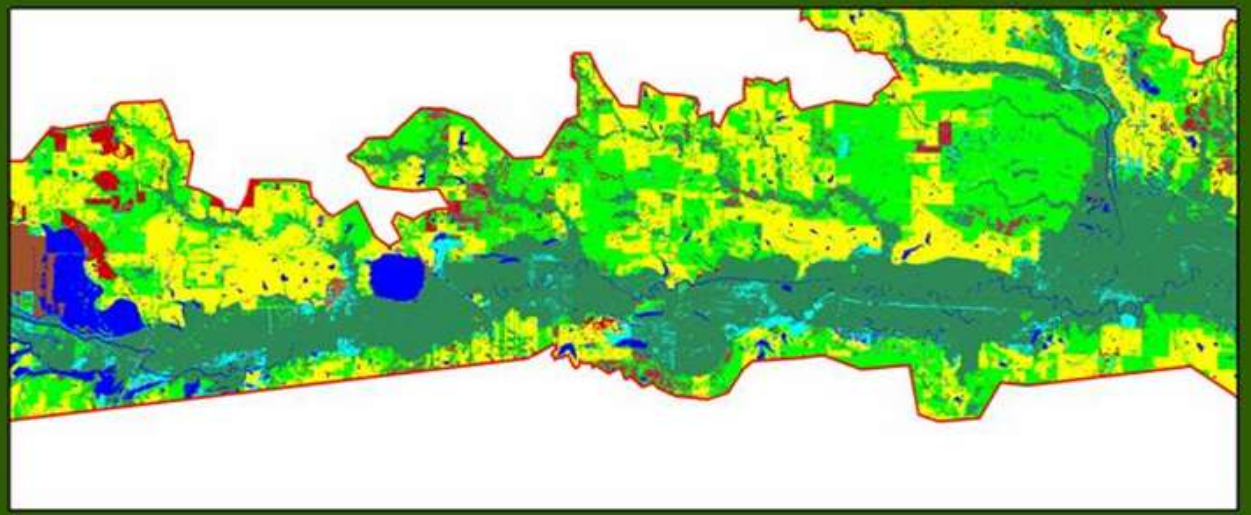
Results and Discussion: Comparison to Previous Classifications

- Differences in the timing of source image acquisition

1997 Classification

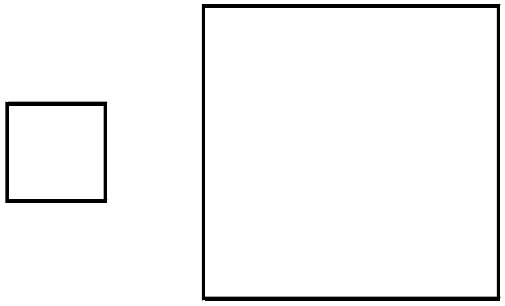


2005 Classification

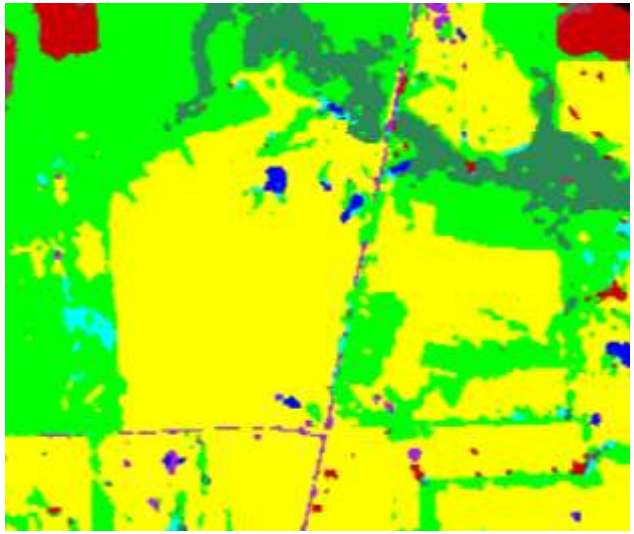


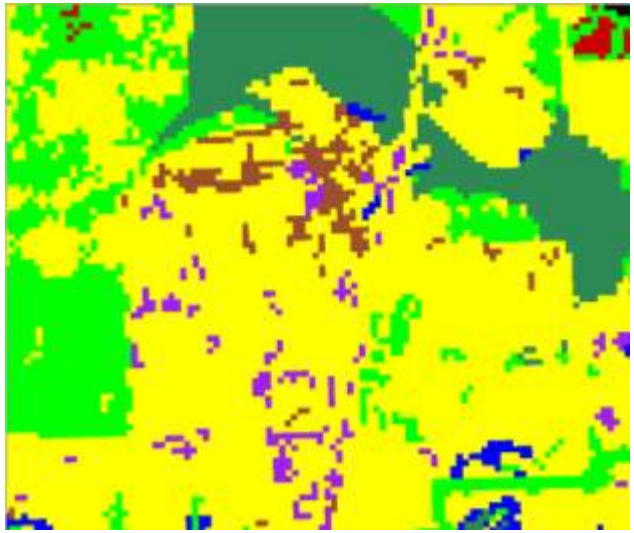
Results and Discussion: Comparison to Previous Classifications

- Differences in resolution of source imagery



10m vs. 30m





Legend

Agriculture	Grassland	Upland
Bland Hdwd	Pine	Urban
EHW	Pine Mix	Water

10m vs. 30m

Conclusions

- Study results in a highly accurate picture of Land Cover/Use at the Sulphur River Basin study area
  - Overall accuracy of 84.41% was achieved in the 2005 classification
  - Accuracy improves to 86.48%, if misclassification between the Pine and Pine Mix classes is discounted
  - Well above the common accuracy goal (75%) and also a substantial improvement over previous image classification studies
- Declining trend in bottomland hardwood abundance is visible from 1974-1991
  - Levels off in 1997 and increases in 2005, with image resolution increasing both years; decreasing trend if re-sampled
  - Increase in Bottomland Hardwood from 1997-2005 occurs for several reasons
    - Differences in the timing of source image acquisition
    - Differences in resolution of source imagery
    - Size of Study Area
    - Improvements in input data and methodology

Acknowledgments

Dr. Sorin Popescu
Dr. Raghavan Srinivasan
Spatial Sciences Laboratory (SSL), TAES
for their advice and support

Tarrant Regional Water District
Texas Forest Service
for providing data throughout the duration of this work

Dr. Marian Erickson
Spatial Sciences Laboratory (SSL), TAES
for her assistance in developing a VB import script

Mr. Sivarajah Mylevaganam
Spatial Sciences Laboratory (SSL), TAES
for assistance in developing AMLs to import/merge LIDAR grids

Mr. Martin Gibson
Mr. Mike Trevino
Spatial Sciences Laboratory, TAES
for assistance in field sampling

Mrs. Kim Hart
Spatial Sciences Laboratory (SSL), TAES
for assistance in developing NWI/NLCD data layer

References

- Baker, C., Lawrence, R., Montagne, C., Patten, D., 2006. Mapping Wetlands and Riparian Areas Using Landstat ETM+ Imagery and Decision-Tree-Based Models. Wetlads 26, 465-474.
- Homer, C., Huang, C., Yang, L., Wylie, B., Coan, M., 2004. Development of a 2001 National Land-Cover Database for the United States. Photogrammetric Engineering & Remote Sensing 70, 829-840.
- ITT Visual Information Solutions. 2006. Boulder, Colorado: ITT Visual Information Solutions.
- Jensen, J.R., 2007. Remote sensing of the environment : an earth resource perspective. Pearson Prentice Hall, Upper Saddle River, NJ.
- Johnston, C.A., Meysembourg, P.M., 2002. Comparison of the Wisconsin and National Wetlands Inventories. Wetlands 22, 386-405.
- Liu, C., Baird, A.L., Scofield, C., Ludeke, A.K., 1997. An Analysis of Bottomland Hardwood Areas at Three Proposed Resevoir Sites in Northeast Texas. GIS Lab, Texas Parks & Wildlife Department, Austin.
- M7 Visual Intelligence, 2006. Processing Steps for Creation of the Grid and Contour files. MTG Engineers.
- Ozemsi, S.L., Bauer, M.E., 2002. Satellite Remote Sensing of Wetlands. Wetlands Ecology and Management 10, 381-402.
- Prism Group, 2007. Prism Data. Oregon Climate Service, Oregon State University, Corvallis, Oregon.
- Richards, J.A., Jia, X., 2006. Remote sensing digital image analysis: an introduction. Springer, Berlin.
- Rulequest Research, 2007. Data Mining Tools See5 and C5.0. St Ives, New South Wales, Australia.
- Sivanpillai, R., Riley, G., Wright, N.W., Srinivasan, D.R., 2000. Land Cover/Use Change Detection Using Landstat MSS & TM Imagery for a Nine-County Region in North East Texas. Spatial Sciences Laboratory, Department of Forest Science and TAES, Texas A&M University System.
- SPOT Image, 2006. The SPOT Image Products. CNES, Toulouse, France.
- U.S. Fish & Wildlife Service, 2007. National Wetlands Inventory.
- United States Department of Agriculture, 1995. Soil Survey Geographic (SSURGO) Data Base: Data Use Information. Natural Resources Conservation Service, National Soil Survey Center.
- United States Department of Agriculture, 2006. National Agriculture Imagery Program. Farm Service Agency.
- USGS, 2000. The National Hydrology Dataset. U.S. Department of the Interior.

Study Commission on Region C Water Supply
Task 6.1 – Innovative Compensation

June 21, 2010 |

Carolyn Brittin

Texas Water Development Board

Senate Bill 3 Provisions Passed in 80th Legislative Session

- Texas Water Code Section 16.051(i)
- Texas Water Code Section 16.143
- Texas Water Code 16.144

Proposed in Legislation that did not pass

- H.B. 2470, 80th Legislative Session
  - Sections 1, 3.02, and 3.03
- S.B. 728, 81st Legislative Session
  - Section 3

Study Commission on Region C Water Supply

Task 7.1 – Surface Water Project Surface Acres

Marvin Nichols 1A

- Region C 2010 Initially Prepared Plan: Total land estimated for dam & reservoir is 77,427 acres

- 2008 Reservoir Site Protection Study (TWDB Report 370): Estimated inundation to top of conservation pool is 67,392 acres; total estimate of land purchased for dam and reservoir is 77,427 acres

- Study Commission Phase 1 report: Estimated reservoir at conservation pool will inundate 67,392 acres

Lake Wright Patman

Study Commission Phase 1 and Phase 2 findings

- Reallocation to 230’ Conservation Pool:
  - 11,961 Acres Inundated
- Reallocation to 240’ Conservation Pool:
  - 32,666 Acres Inundated

Lake Wright Patman

2011 Region C Initially Prepared Plan

Current operation interim curve elevation at highest point 227.5'

- Texarkana activates contract for increased conservation storage at highest elevation of 228.61' in June:
  - 1,461 Acres Inundated
- Reallocation to 228.64' all year for additional 180,000 AFY:
  - 1,501 Acres Inundated

**Freese and Nichols, Inc., 2003, System Operation Assessment of Lake Wright Patman and Lake Jim Chapman*

PROPOSED TIMELINE
TO
COMPLETE WORK
OF
STUDY COMMISSION ON REGION C WATER SUPPLY

DATE	ACTIVITY
21-Jun-10	**Meeting of Study Commission** ·Review all remaining information and data relating to water supply development in Region D ·Review outline and format for "Report to 82nd Legislature" ·Adopt timeline to complete work of Study Commission
1-Sep-10	Receive and begin review of Draft "Report to 82nd Legislature". Provide comments to Study Commission Co-Chairs by 30 Sept 2010 for consideration by full Commission
Week of 4-Oct-10	**Meeting of Study Commission** ·Review and adopt the Draft "Report to 82nd Legislature" with final edits ·Instruct TWDB to prepare final "Report to 82nd Legislature"
Week of 1-Nov-10	**Meeting of Study Commission** ·Consider adoption of "Report to 82nd Legislature" ·Authorize TWDB to file "Report to 82nd Legislature" by 30 Nov 2010

SB3 Section 4.04(e)(6)

Task: Review innovative methods of compensation to affected property owners, including royalties for water stored on acquired properties and annual payments to landowners for properties acquired for the construction of a reservoir to satisfy future water management strategies.

Innovative Compensation Summaries from 80th and 81st Legislative Sessions

Provisions that passed during the 80th Legislative Session:

Senate Bill 3, Section 3.01: Amended State Water Planning statute, Texas Water Code (TWC) 16.051, to add Subsection (i) as follows:

> (i) For purposes of this section, the acquisition of fee title or an easement by a political subdivision for the purpose of providing retail public utility service to property in the reservoir site or allowing an owner of property in the reservoir site to improve or develop the property may not be considered a significant impairment that prevents the construction of a reservoir site under Subsection (g). A fee title or easement acquired under this subsection may not be considered the basis for preventing the future acquisition of land needed to construct a reservoir on a designated site.

Senate Bill 3, Section 3.02: Added TWC Sec. 16.143, as follows:

> Sec. 16.143. Option to Lease. (a) A former owner of real property used for agricultural purposes that was acquired, voluntarily or through the exercise of the power of eminent domain, for a reservoir whose site has been designated as unique for the construction of a reservoir under Section 16.051(g) is entitled to lease the property from the person who acquired the property under terms that allow the former owner to continue to use the property for agricultural purposes until the person who acquired the property determines that such use must be terminated to allow for the physical construction of the reservoir. Consistent with Subsection (b), the lease is subject to the terms and conditions set forth by the person who has acquired the property that are related to the use of the property by the former owner, including the term of the lease, the rent the former owner is required to pay under the lease, and the uses that may be allowed on the property during the term of the lease.

Senate Bill 3, Section 3.02: Added TWC Sec. 16.144, as follows:

> Sec. 16.144. Environmental Mitigation. (a) If a person proposing to construct a reservoir whose site has been designated as unique for the construction of a reservoir under Section 16.051(g) is required to mitigate future adverse

environmental effects arising from the construction or operation of the reservoir or its related facilities, the person shall, if authorized by the applicable regulatory authority, attempt to mitigate those effects by offering to contract with and pay an amount of money to an owner of real property located outside of the reservoir site to maintain the property through an easement instead of acquiring the fee simple title to the property for that purpose.

(b) An owner of real property may reject an offer made under Subsection (a). If agreement on the terms of an easement under Subsection (a) cannot be reached by the parties after a good faith attempt and offer is made, then the party constructing the reservoir may obtain fee title to the property through voluntary or involuntary means.

Proposed in Legislation that did not pass:

House Bill 2470, 80th Legislative Session, Section 1: Proposed amending Texas Water Code (TWC) Chapter 11, to add Subchapter K as follows:

Subchapter K. Surface Water Fees.
Sec. 11.601. Surcharge on Surface Water Impounded in a Reservoir. (a) The holder of a permit to impound surface water in a reservoir subject to Section 16.143, Water Code shall submit to the commission on an annual basis a surcharge fee equal to the ad valorem tax rate of each political subdivision that assessed ad valorem taxes on property within the reservoir site multiplied by each acre-foot of surface water the permit authorizes be impounded.

(b) Not later than 90 days after the surcharge is submitted under Subsection (a), the commission shall appropriate the surcharge to the political subdivisions that assessed ad valorem taxes on the property located within the reservoir site based upon the proportion of the total ad valorem tax revenue collected by the political subdivisions before the property was acquired to construct the reservoir.

(c) The commission may assess the permit holder a fee in an amount necessary to administer this section.

Sec. 11.602. Royalty Fee on Surface Water Impounded in a Reservoir. (a) The holder of a permit to impound surface water in a reservoir subject to Section 16.143, Water Code shall submit on an annual basis to the commission a royalty fee equal to 10% of the total net revenue earned by the permit holder for the sale or lease of the water authorized to be impounded under the permit.

(b) Not later than 90 days after the royalty fee is submitted under Subsection (a), the fee shall be appropriated by the commission to the property owners listed in Section 16.143(a)(3) based upon the number of acres the property owner had purchased or taken for the construction of the reservoir.

(c) The commission may assess the permit holder a fee in an amount necessary to administer this section.

House Bill 2470, 80th Legislative Session, Section 3.02: Proposed amending Texas Property Code Chapter 21, to add Section 21.0422 as follows:

> Sec. 21.0422. Assessment of Damages: Property Condemned for a Reservoir and Related Facilities. (a) In a condemnation proceeding initiated to acquire property under Section 21.0122, the special commissioners or court shall admit and consider evidence relating to each injury and loss, if any, to the property owner that a reasonably prudent person would consider in a negotiated transaction that is not subject to this chapter.
>
> (b) If the property to be condemned under Section 21. 0122 is agricultural property subject to a purchase of development rights agreement acquired under Section 16.145, Water Code, the minimum damages awarded shall be the difference between the agricultural value and fair market of the property when the petition to condemn the property was submitted to the court.

House Bill 2470, 80th Legislative Session, Section 3.03: Proposed amending Texas Property Code Chapter 21, to add Section 21.0471 as follows:

> Sec. 21.0471. Assessment of Fees: Condemnation of Property for a Reservoir. If a court hearing a suit under Section 21.0122 finds that the damages awarded by the special commissioners or the court exceeds the damages a condemnor offered to the property owner before the proceeding began, the court shall order the condemnor to pay any reasonable attorney and expert fees incurred by the owner.

Senate Bill 728, 81st Legislative Session, Section 3: Proposed amending Texas Property Code Subchapter C, Chapter 21, to add Section 21.0422 as follows:

> Section 21.0422. Alternative Damages: Condemnation of Easement by Private Entity. With the property owner's consent, a private entity that condemns an easement may, as an alternative to paying damages awarded under this subchapter, agree to pay the owner an intangible legal right to receive a percentage of the entity's profits associated with the use of the easement.

Study Commission on Region C Water Supply
Proposed Report Outline and Content
By TWDB Staff
June 21, 2010

S.B. 3 Requirement for Report: "Not later than December 1, 2010, the study commission shall deliver a report to the governor, lieutenant governor, and speaker of the house of representatives that includes:

(1) Any studies completed by the study commission;
(2) Any legislation proposed by the study commission;
(3) A recommendation as to whether Marvin Nichols should remain a designated reservoir site; and
(4) Any other findings and recommendations of the study commission."

I. Cover Page
II. Transmittal letter
III. Table of Contents
IV. Introduction
    a. Members
    b. Charges
    c. Summary of Study Committee Activities – Include list of meetings held, including dates and locations, topics and activities covered, public comments, contracting, scope of work, etc.
V. Findings and Recommendations
VI. Appendixes
    a. Phase I and II Report by Espey Consultants;
    b. Separate Appendix for each presentation or other materials provided to commission for consideration; and
    c. Public Comment