



well is for geothermal? *

Presentation Overview

¥ **Texas Land Situation**

¥ **Texas Geothermal Overview**

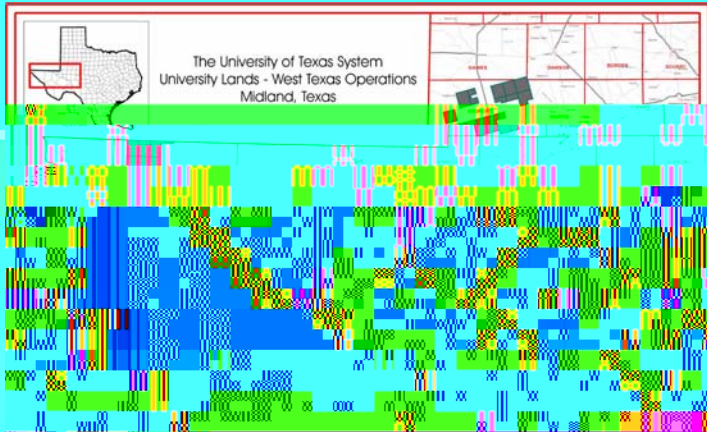
¥ **Policy Recommendations**

¥ **Conclusions**

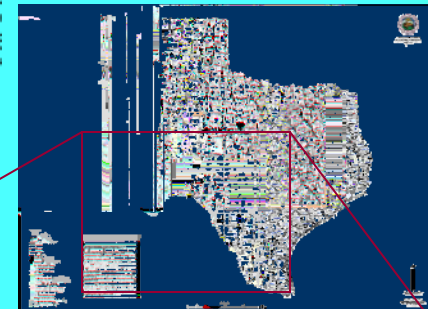
Texas Lands Are State Or Privately Owned

University Lands

2,104,772 acres in West Texas



| | | | | | | |
|----------|-----------|-------------------------------|-----------|------------|-----------|---|
| Andrews | 293,029 | Crane | 65,244 | Crockett | 368,523 | |
| Castro | 1,000,000 | Deaf Smith | 1,000,000 | Donnerstag | 1,000,000 | |
| Cherokee | 2,000 | Hudspeth | 493,405 | El Paso | 11,745 | |
| Comanche | 25,881 | Martin | 16,687 | Friest | 25,353 | |
| Concho | 10,863 | Reagan | 218,105 | Schleicher | 61,835 | |
| Corral | 1,885 | Upton | 86,429 | Winkler | 49,836 | |
| Counties | 31,047 | Total Acres: 2,104,772 | | | Ward | 8 |



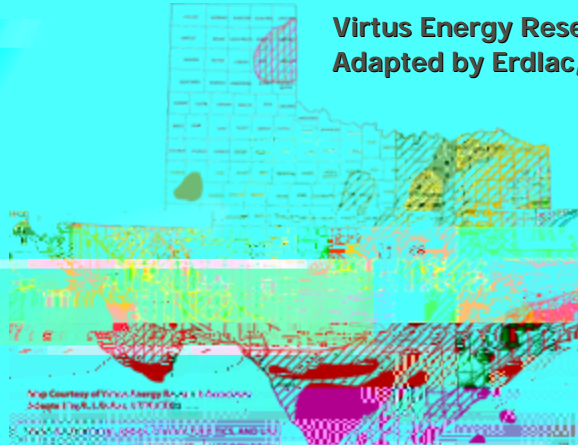
Texas General Land Office

20.3 million acres in West Texas, the Gulf Coast extending 10.3 miles from shoreline, state agency acreage & timber lands in East Texas



Texas Geothermal Energy As: Geoexchange – Direct Use – Electrical

Virtus Energy Research Associates, 1995
Adapted by Erdlac, 2006



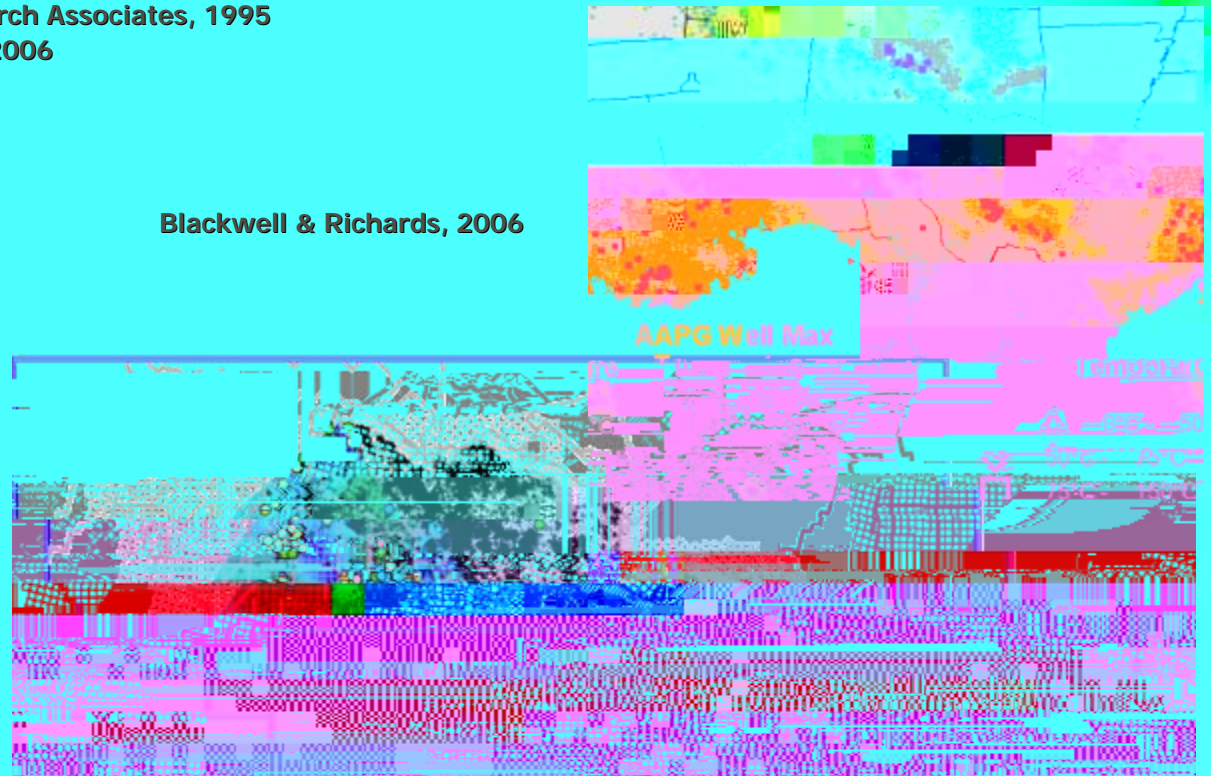
Erdlac & others, 2006

Well symbol color intervals every 1000 ft:
18,000 – 30,000 ft

Lower yellow half circle indicates BHT
data available.

CI for BHT data every 5°F: 270 – 410°F

Blackwell & Richards, 2006



Texas State Recommendations On Geothermal Energy Development

Recommendations Are In Four Categories:

¥ **Technical Assistance**

¥ **Industrial / Economic Development**

¥ **Advocacy**

¥ **Policy / Legal Action**

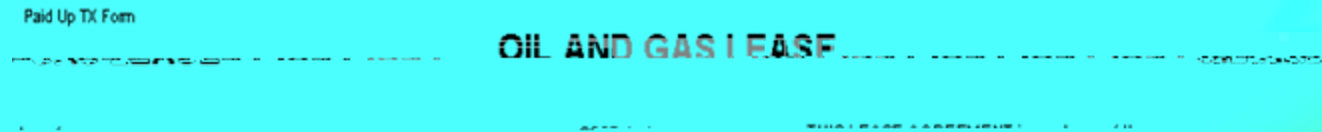
Recommendations: Industrial / Economic Development

Recommendation 2 – Leasing Definition And Clarification

The typical O&G lease does not directly include geothermal in the agreement with the mineral owner...or do they?

If the word 'geothermal' is not used does this type of wording also include heat?

And if not, does the injection of hot brine constitute a breach of law under the Geothermal Resources Act whereby the heat is being wasted?



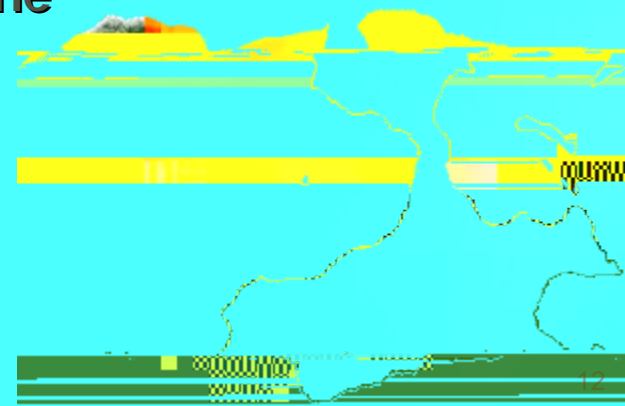
Recommendations: Advocacy

Recommendation 4 – Financial Forums

- ¥ Renewable energy finance forums that include geothermal.
- ¥ Separate geothermal finance forum due to uniqueness of resource – long lead time in establishment.
- ¥ Location of forums be in different locations throughout the state.

Recommendation 5 – Nesting

- ¥ The planned development of two or more (renewable) resources in concert with each other in the same geographic area for the purpose of:
 - Offsetting a weakness of one resource by the strength of another.
 - Guaranteeing that a minimum amount of electrical power is available for baseload use at all times.



Recommendations: Policy / Legal Action

Recommendation 9 – Shallow Geothermal Use

- ¥ **Past Legislation defined geothermal as a mineral and energy resource, managed by the Texas Railroad Commission (Oberbeck, 1977) suggesting ownership by the mineral owner.**
- ¥ **Texas Oil And Gas Conservation Laws: Title 5: §141.003 Definitions: (4) “Geothermal energy and associated resources” means: (C) heat or other associated energy found in geothermal formations;**
- ¥ **What legislation, if any, covers the access to shallow heat use with geoexchange systems?**
- ¥ **What constitutes the legal definition of a “geothermal formation”?**
- ¥ **May need a revisit of terms by legislation to more clearly define the forms of geothermal, its ownership, and its use.**

