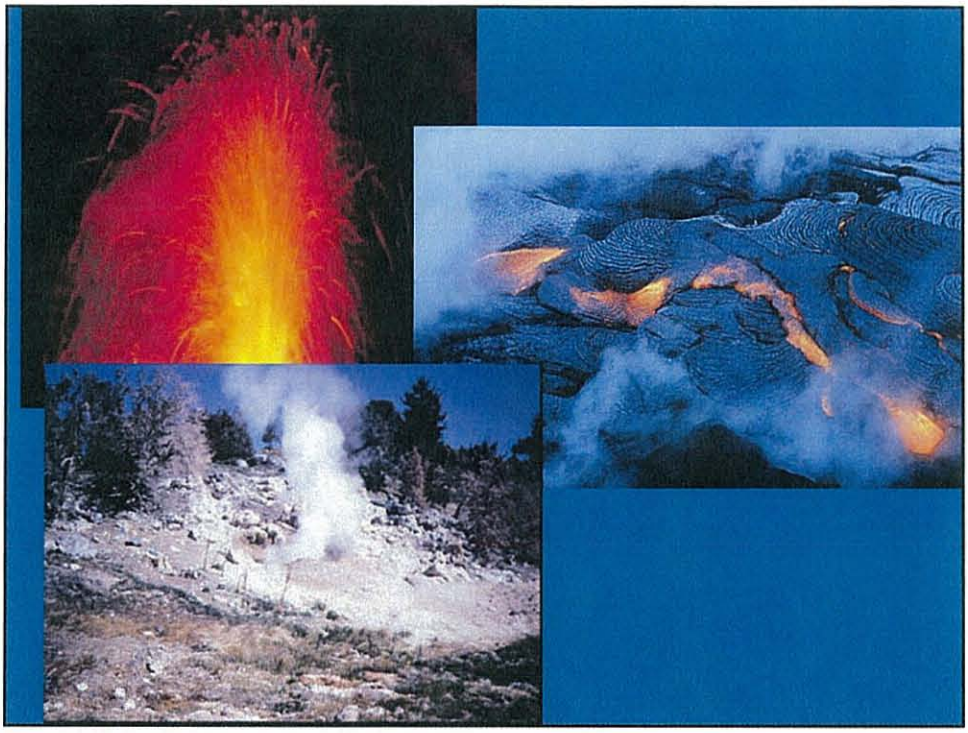
Geothermal Development in Boise - 120 Years of Success!

Ken Neely
Idaho Department of Water Resources
May 20, 2010

Heat Sources in the Earth

- Remnant from iron core formation
- Gravitational compression
- Radioactivity decay



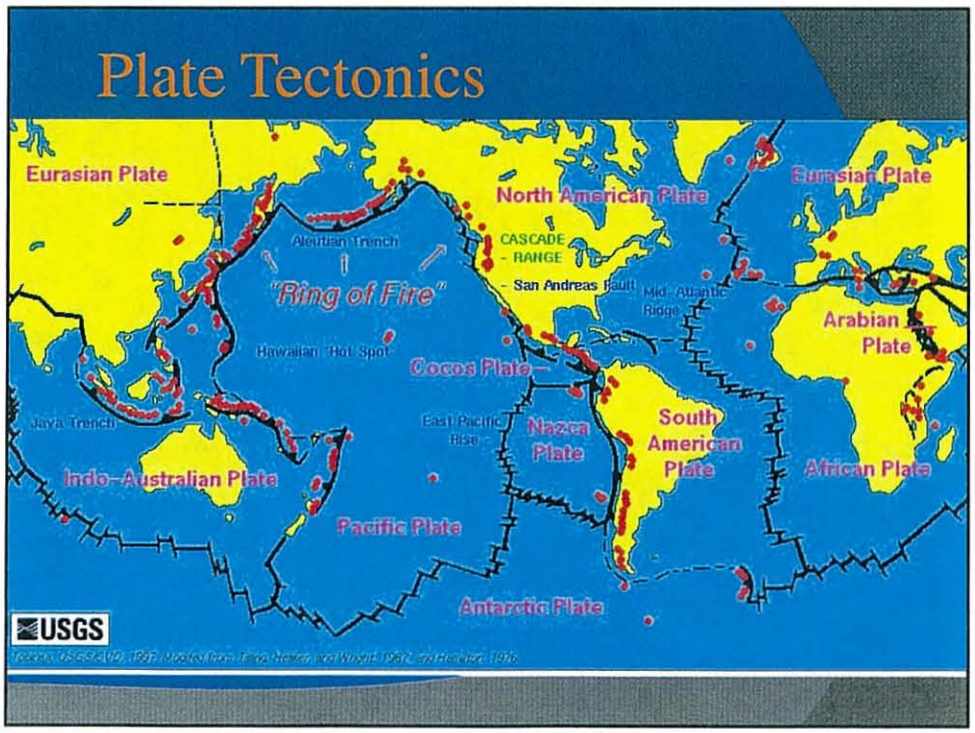
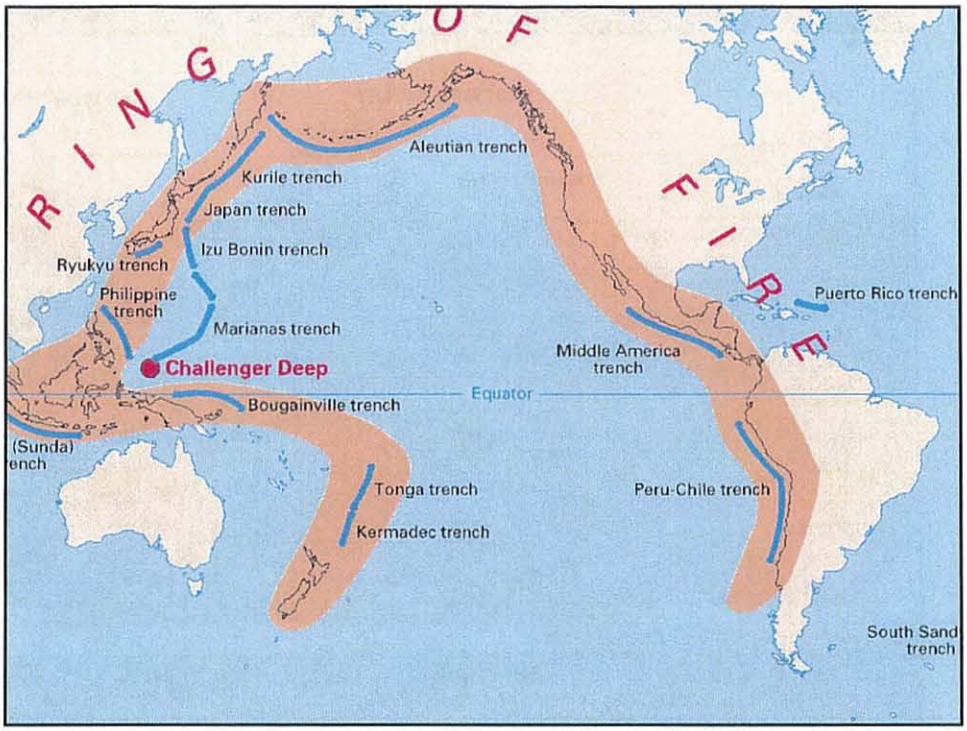
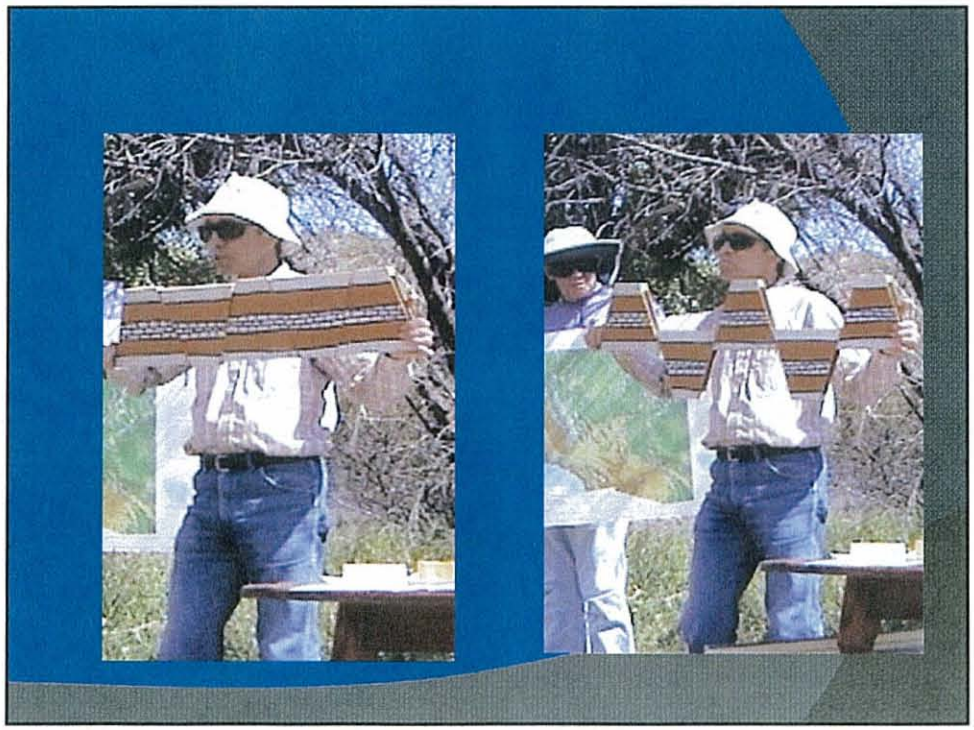
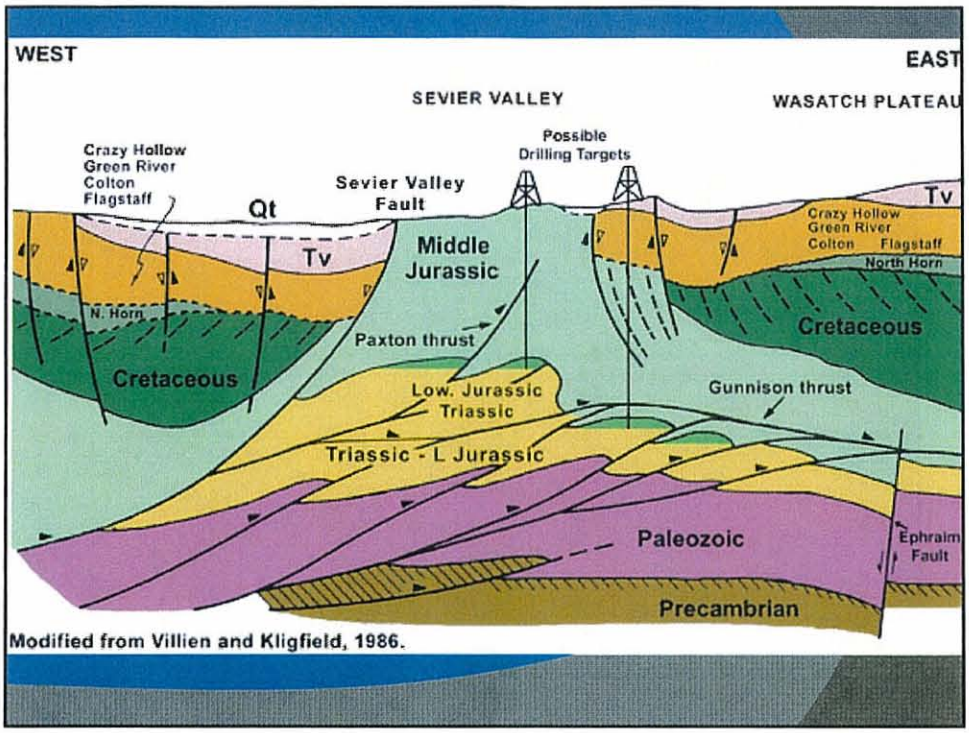


Plate Tectonics
Eurasian Plate
North American Plate
Eurasian Plate
Aleutian Trench
CASCADE
- RANGE
"Ring of Fire"
- San Andreas Fault
Mid-Atlantic
Ridge
Arabian
Plate
Hawaiian "Hot Spot"
Cocos Plate
Java Trench
East Pacific
Rise
Nazca
Plate
South
American
Plate
African Plate
Indo-Australian Plate
Pacific Plate
Antarctic Plate
USGS

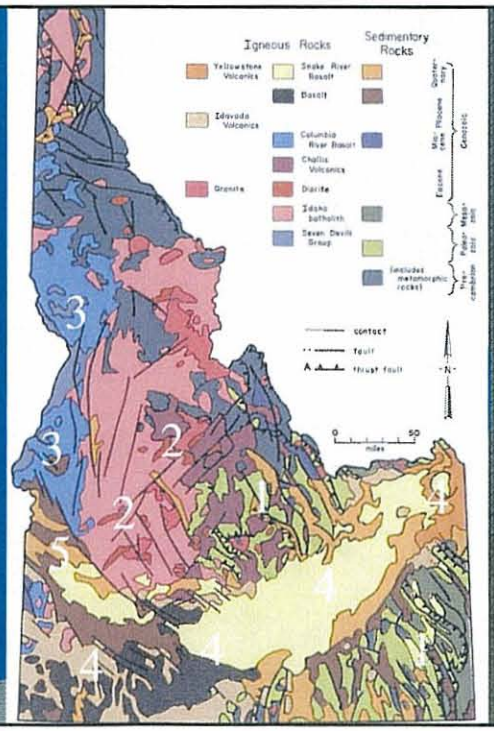

RING OF FIRE
Aleutian trench
Kurile trench
Japan trench
Izu Bonin trench
Ryukyu trench
Philippine trench
Marianas trench
Challenger Deep
Bougainville trench
Equator
(Sunda) ench
Tonga trench
Kermadec trench
Middle America trench
Puerto Rico trench
Peru-Chile trench
South Sand trench

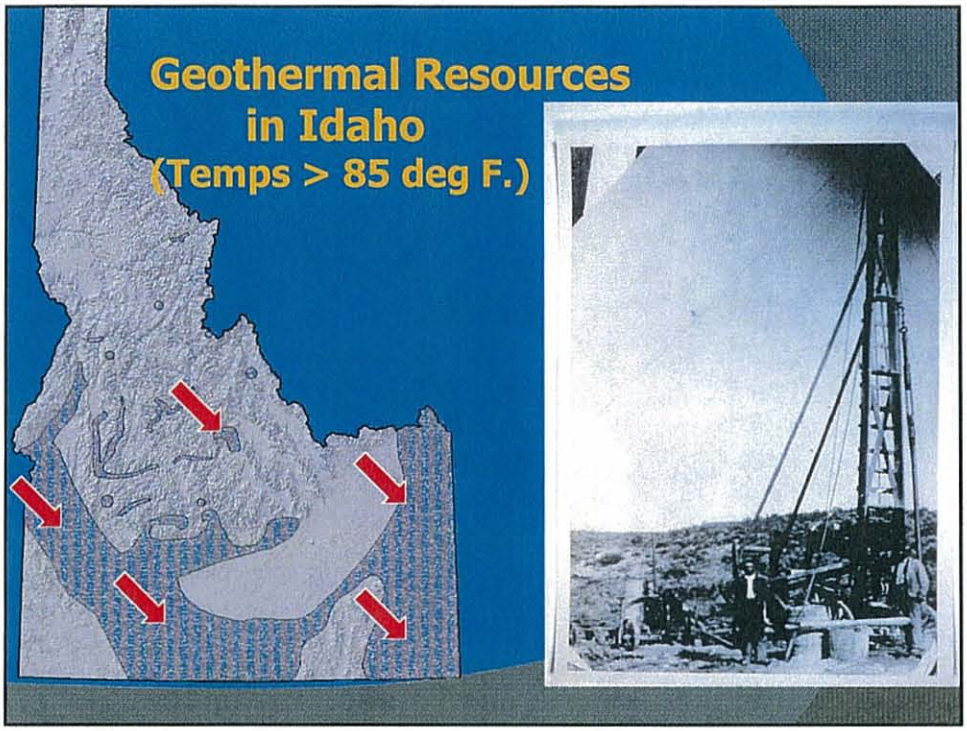


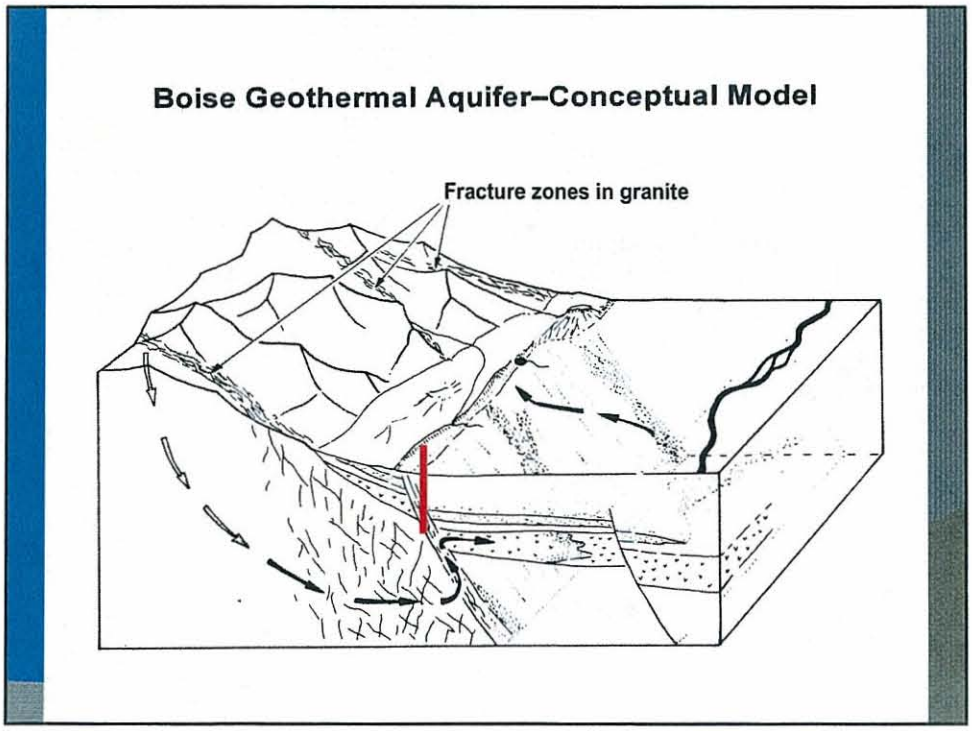


Idaho Geology

1 Paleo and Meso
2 Idaho Batholith
3 Columbia River Basalt
4 Volcanics of the Great Rift and Hot Spot
5 Basin Infill



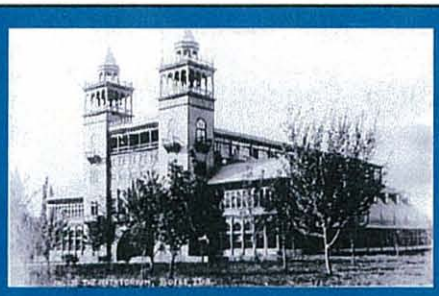

Geothermal Resources
in Idaho
(Temps > 85 deg F.)


Boise Geothermal Aquifer–Conceptual Model
Fracture zones in granite

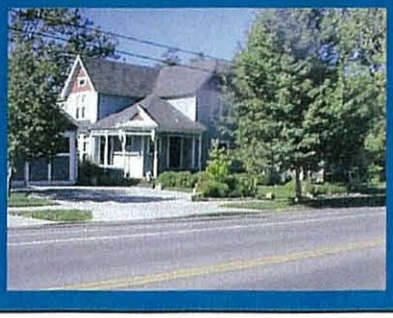
Boise's Geothermal Timeline

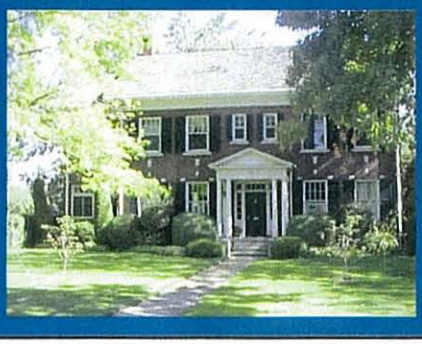
Boise Warm Springs
Water District born

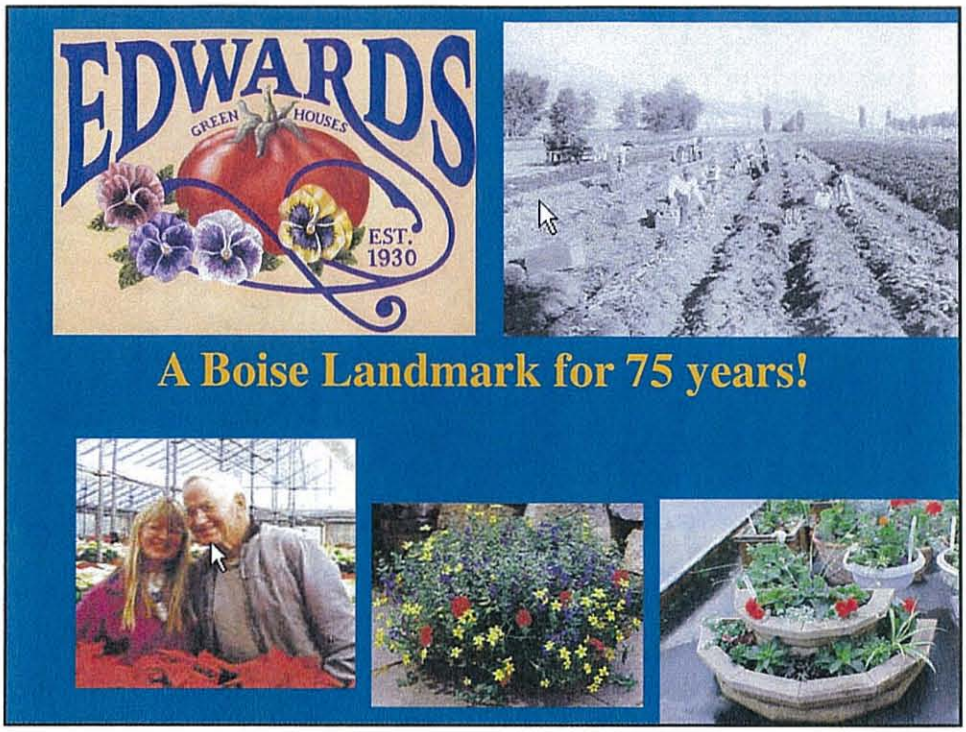
1890

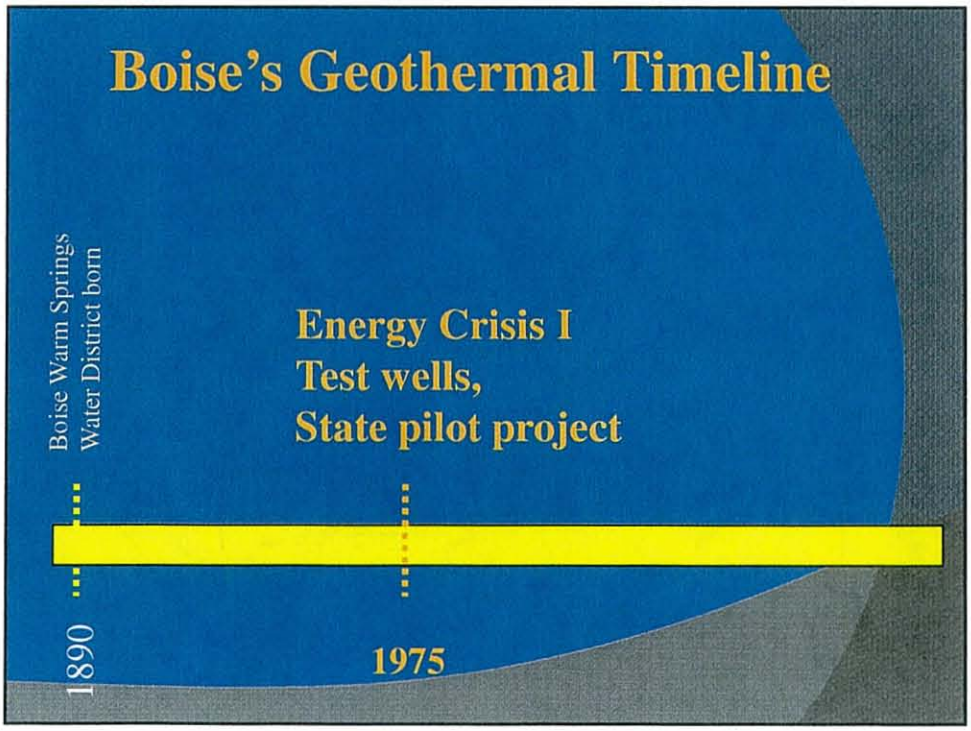


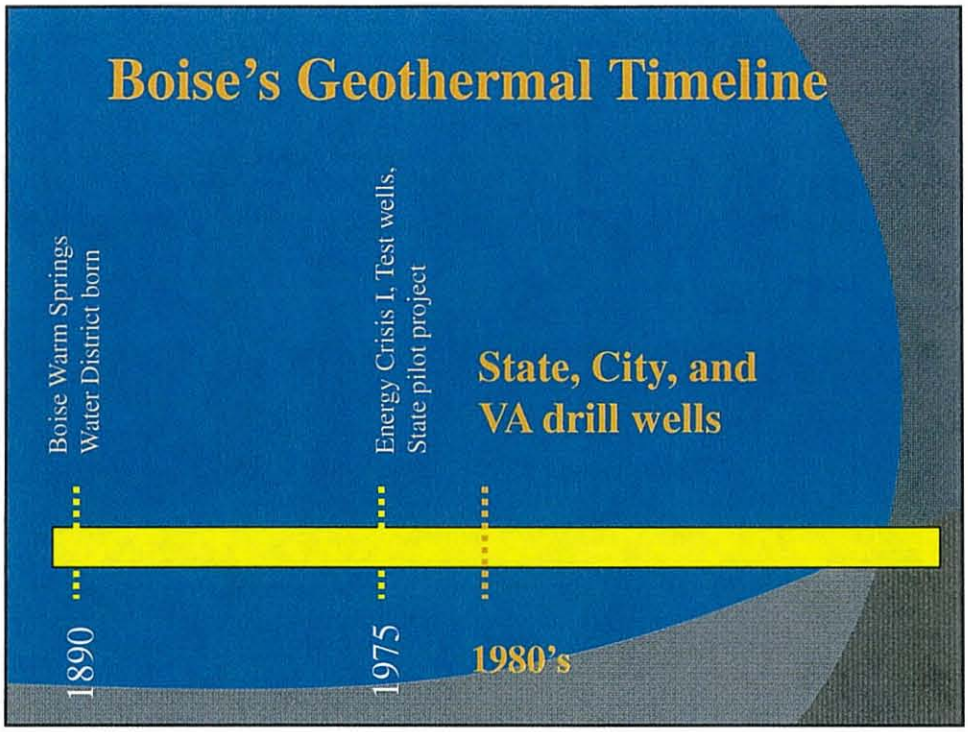
Boise Warm Springs Water District
Two production wells

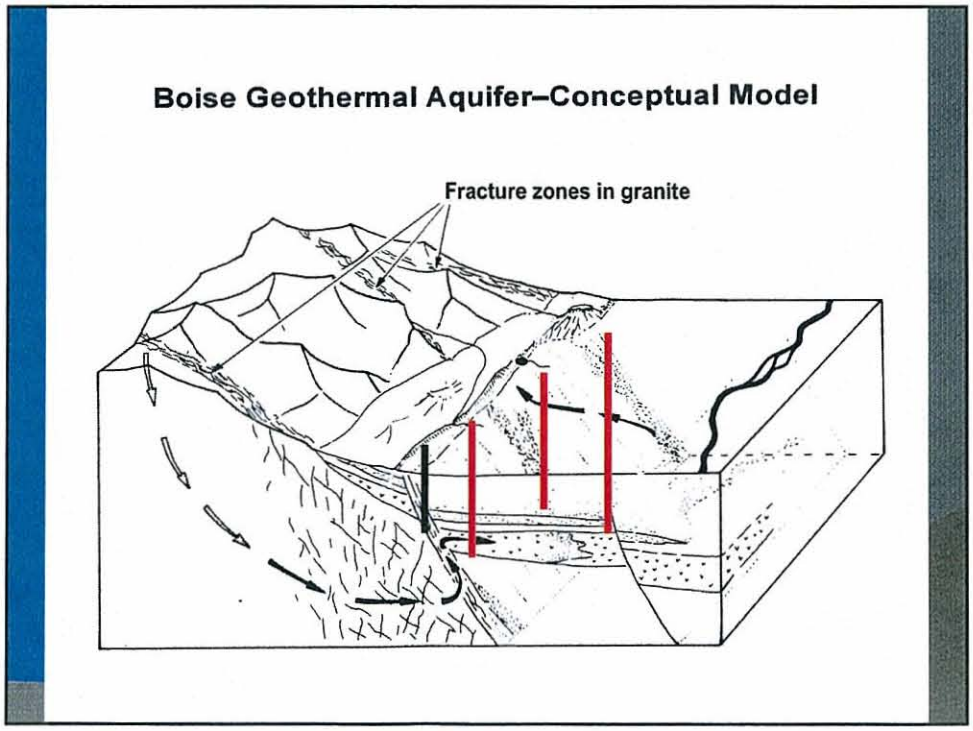




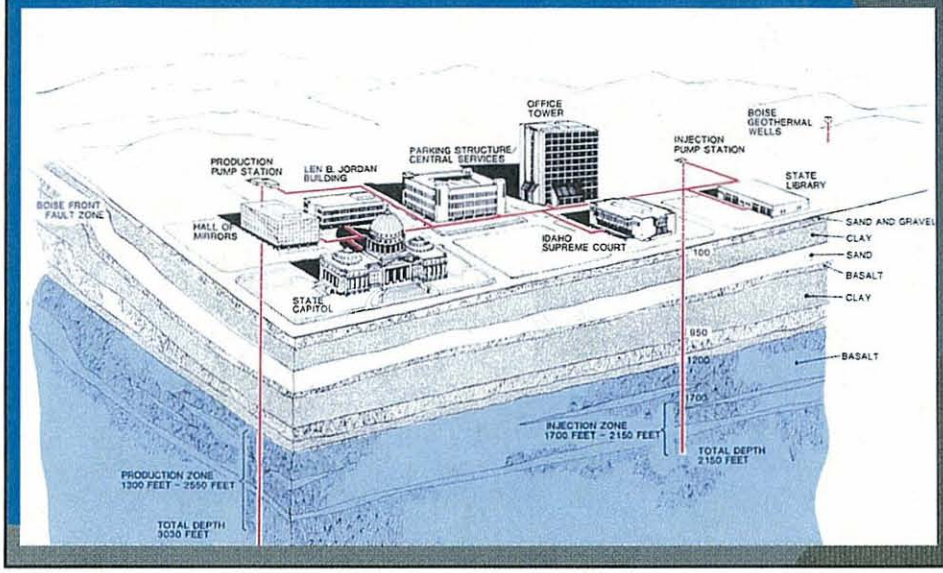

EDWARDS
GREEN HOUSES
EST. 1930
A Boise Landmark for 75 years!

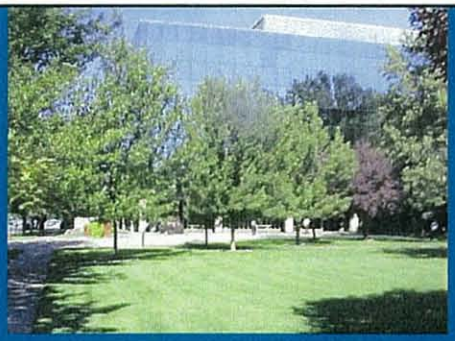

Boise's Geothermal Timeline
Boise Warm Springs Water District born
1890
Energy Crisis I
Test wells,
State pilot project
1975

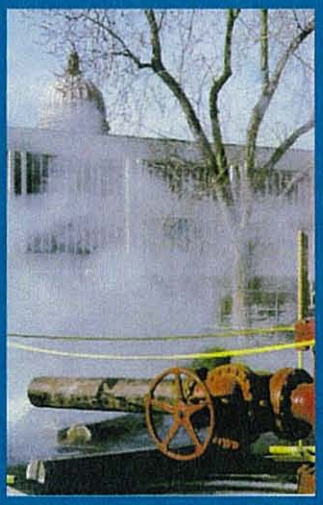

Boise's Geothermal Timeline
1890
Boise Warm Springs
Water District born
1975
Energy Crisis I, Test wells,
State pilot project
1980's
State, City, and
VA drill wells


Boise Geothermal Aquifer–Conceptual Model
Fracture zones in granite

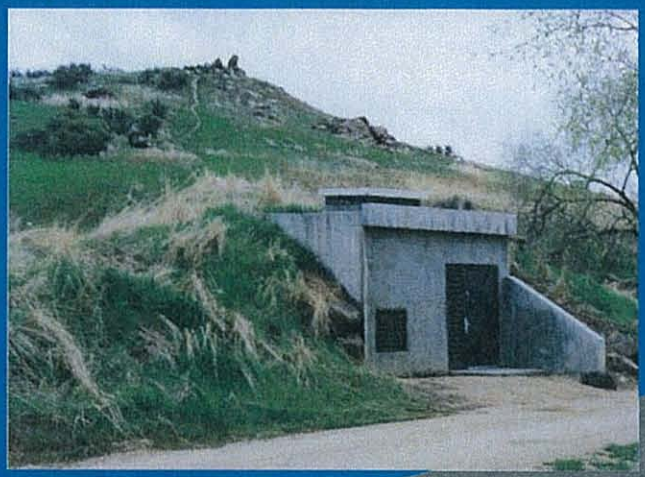
State of Idaho Capitol Mall System
One production well; one injection well.



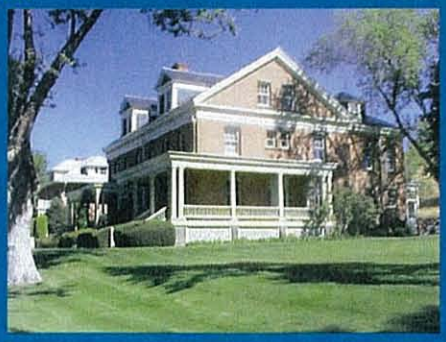


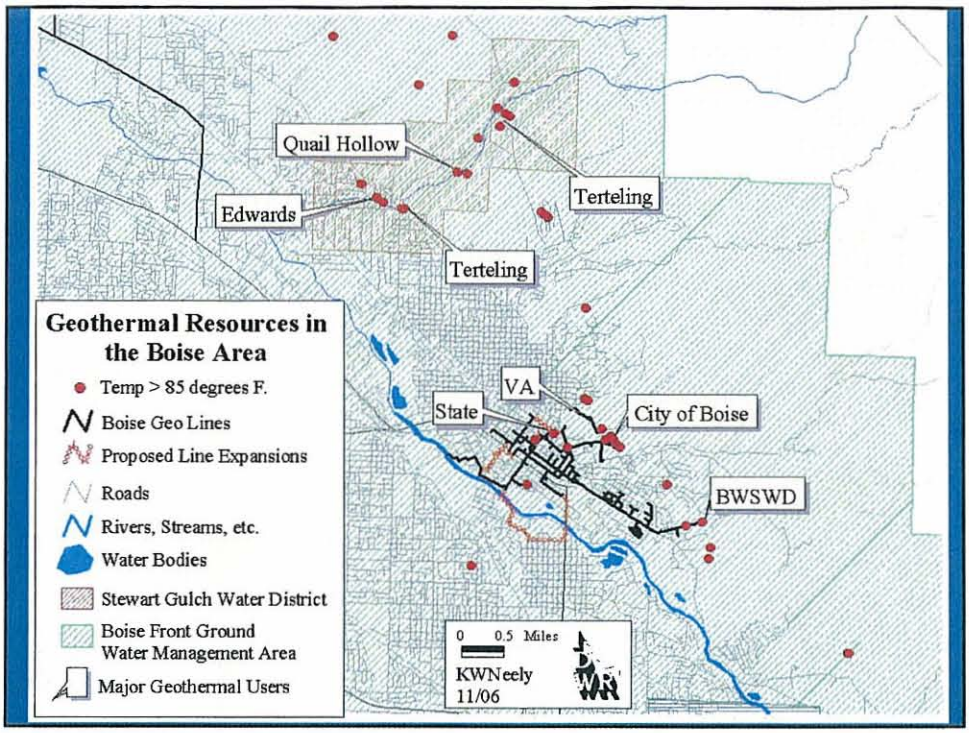


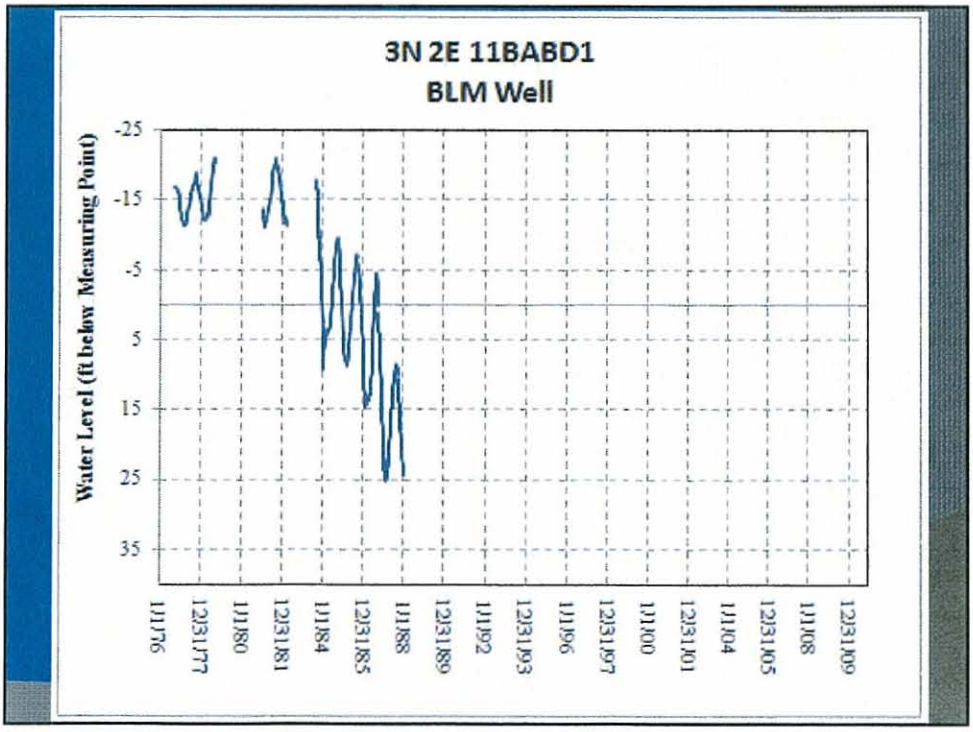
City of Boise
Four production wells



Veterans Administration
One production well;
one injection well.




Quail Hollow
Edwards
Terteling
Terteling
VA
State
City of Boise
BWSWD
Geothermal Resources in the Boise Area
Temp > 85 degrees F.
Boise Geo Lines
Proposed Line Expansions
Roads
Rivers, Streams, etc.
Water Bodies
Stewart Gulch Water District
Boise Front Ground Water Management Area
Major Geothermal Users
0 0.5 Miles
KWNeely
11/06


3N 2E 11BABD1
BLM Well
Water Level (ft below Measuring Point)
-25
-15
-5
5
15
25
35
1/1/76
12/31/77
1/1/80
12/31/81
1/1/84
12/31/85
1/1/88
12/31/89
1/1/92
12/31/93
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12/31/97
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1/1/04
12/31/05
1/1/08
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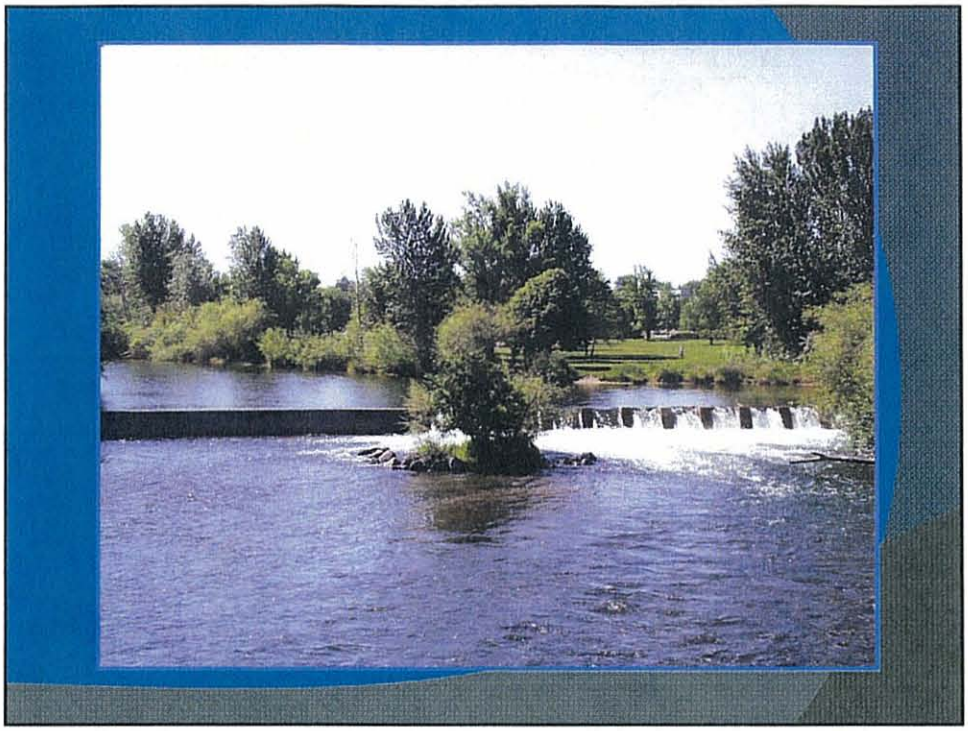

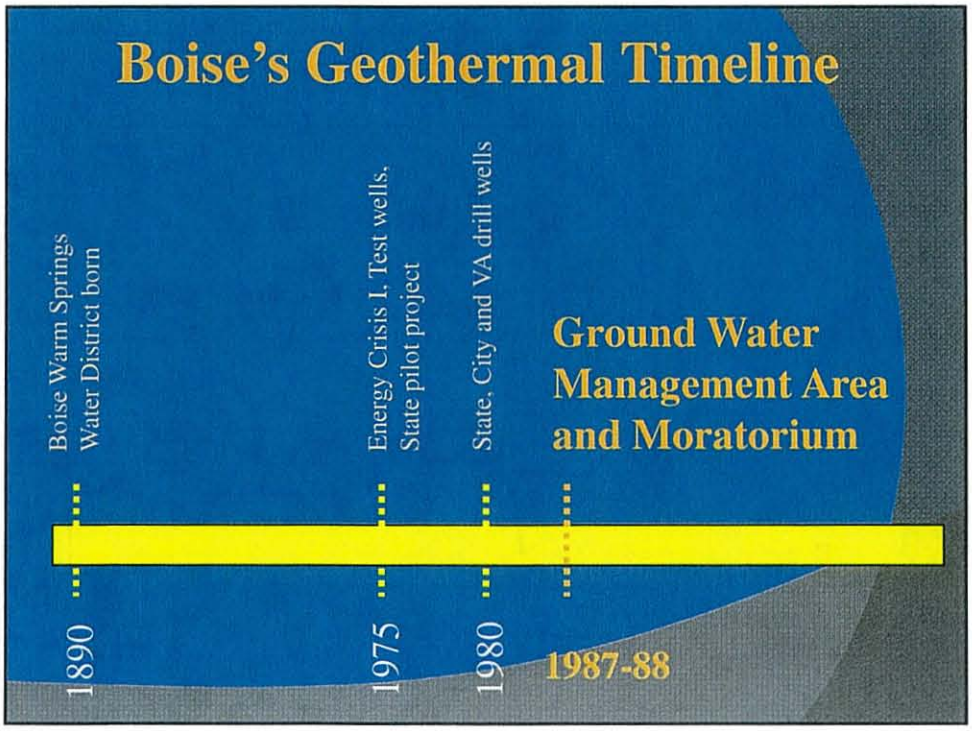
Boise's Geothermal Timeline
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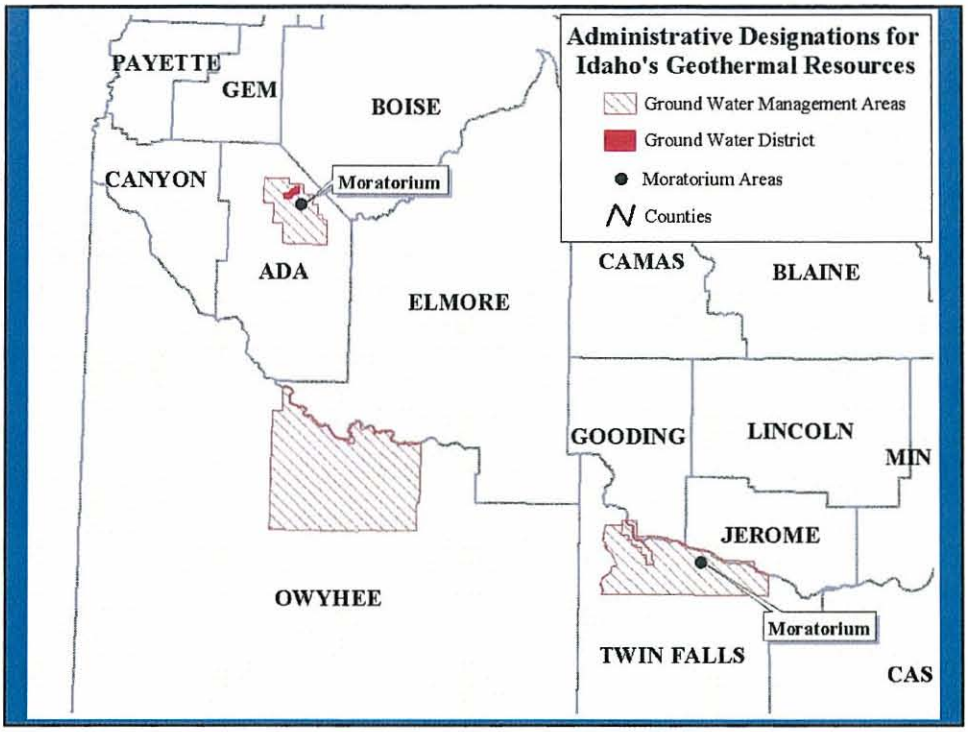
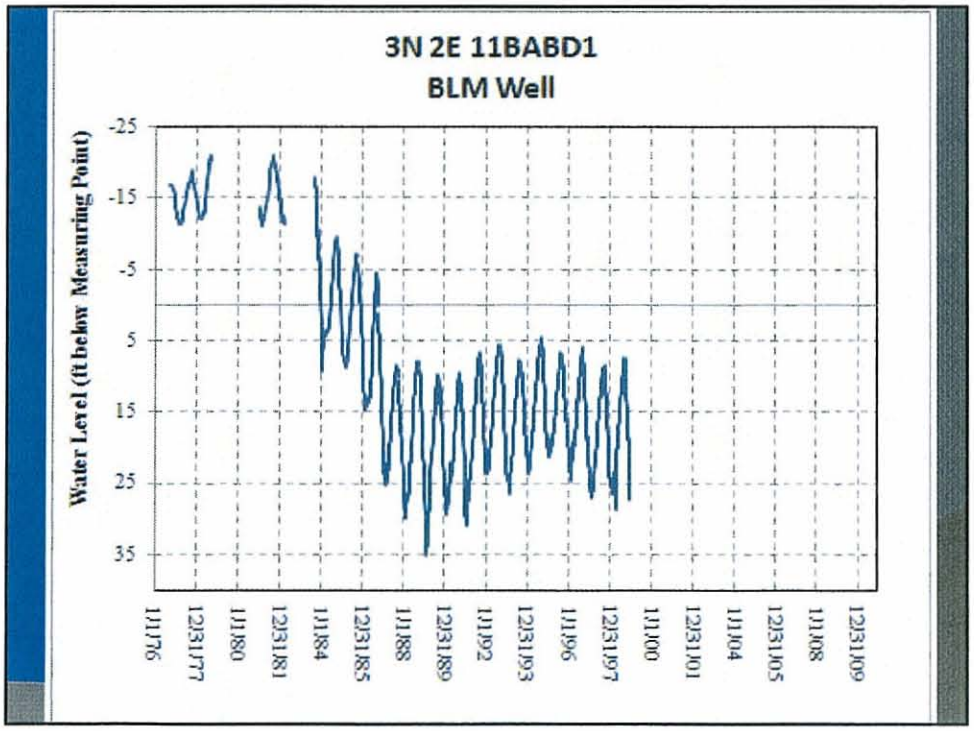
Boise Warm Springs Water District born
1975
Energy Crisis I. Test wells. State pilot project
1980
State, City and VA drill wells
1987-88
Ground Water Management Area and Moratorium


Administrative Designations for Idaho's Geothermal Resources
Ground Water Management Areas
Ground Water District
Moratorium Areas
Counties
PAYETTE
GEM
BOISE
CANYON
Moratorium
ADA
ELMORE
CAMAS
BLAINE
GOODING
LINCOLN
MIN
JEROME
OWYHEE
Moratorium
TWIN FALLS
CAS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12/31/97
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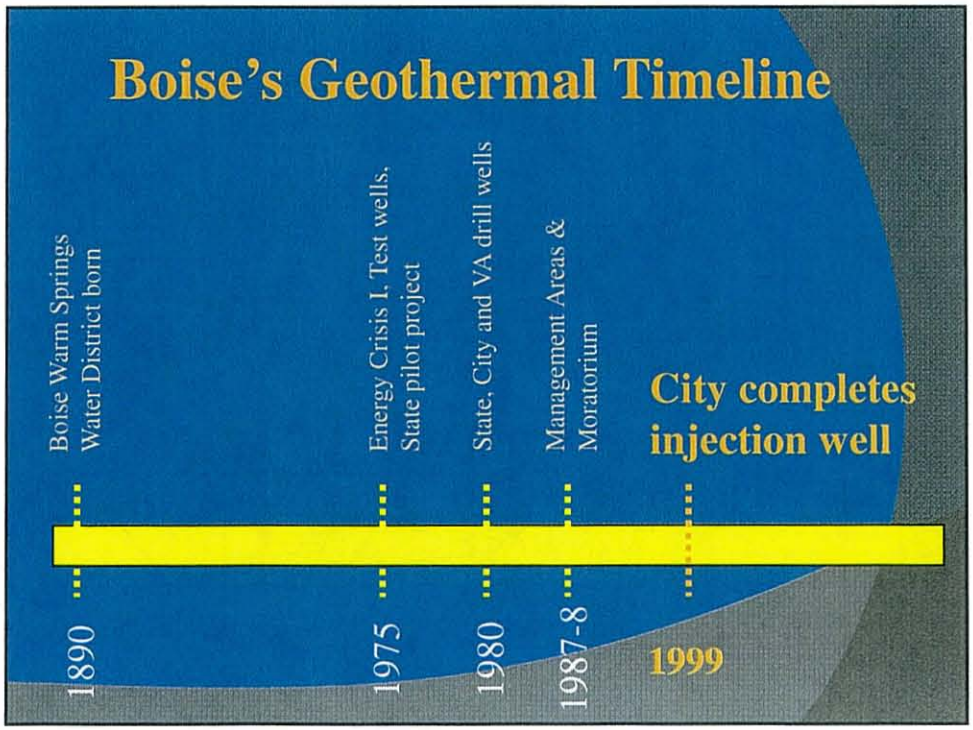
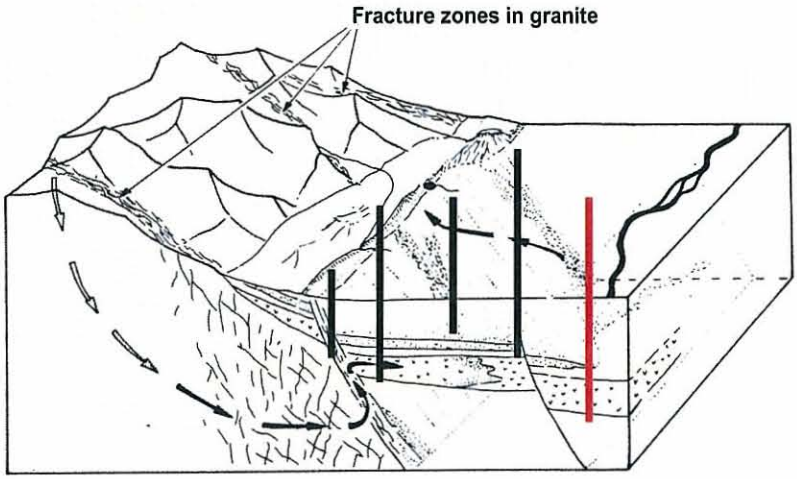
12/31/01
1/1/04
12/31/05
1/1/08
12/31/09

There's got to be an easier way…

Boise's Geothermal Timeline



Boise Geothermal Aquifer–Conceptual Model



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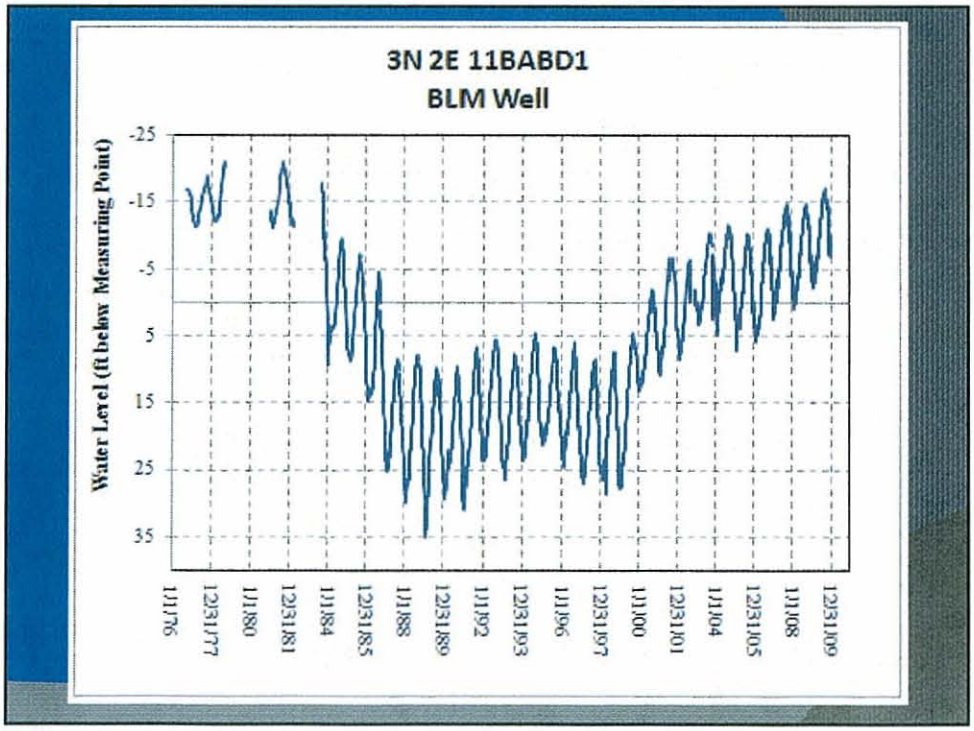
1/1/96
12/31/97
1/1/00
12/31/01
1/1/04
12/31/05
1/1/08
12/31/09

Boise's Geothermal Timeline
1890
Boise Warm Springs Water District born
1975
Energy Crisis I, Test wells. State pilot project
1980
State, City and VA drill wells
1987-8
Management Areas & Moratorium
1999
City completes injection well
2002
City gets 15% production increase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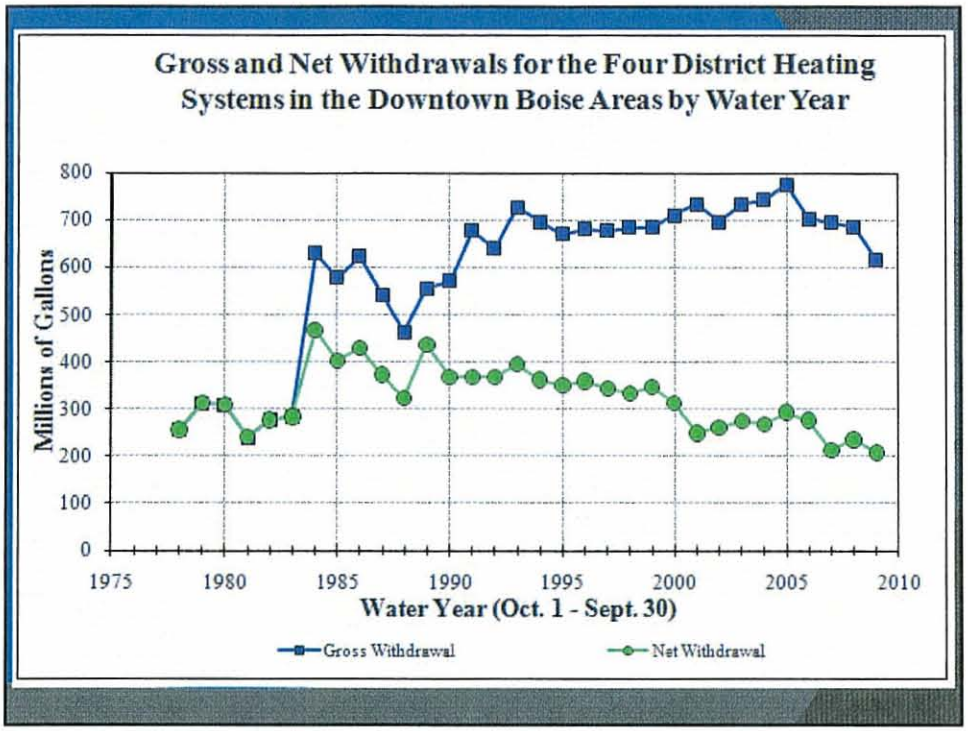
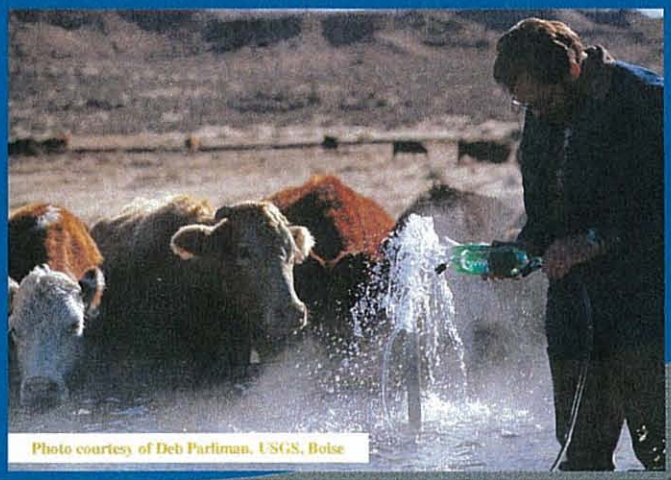


The Boise Front Geothermal System illustrates the importance of geologic modeling and re-injection in order to properly manage Idaho's geothermal resources.

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