



**An Overview of the
SB07-91 Task Force on
Renewable Resource Generation
Development Areas**

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Governor's Energy Office

November 1, 2007

Overview of SB07-091



SENATE BILL 07-091

BY SENATOR(S) Schwartz, Boyd, Fitz-Gerald, Gordon, Groff, Isgar, Romer, Sandoval, Shaffer, Tapia, Tochtrop, Tupa, Veiga, Williams, and Windels;

also REPRESENTATIVE(S) Massey, Carroll M., Frangas, Gibbs, Green, Hodge, Jahn, Kerr A., Kerr J., Labuda, McFadyen, Merrifield, Romanoff, Solano, Stafford, Stephens, Summers, and Todd.

CONCERNING RENEWABLE RESOURCE GENERATION DEVELOPMENT AREAS,
AND, IN CONNECTION THEREWITH, CREATING A TASK FORCE, AND
MAKING AN APPROPRIATION THEREFOR.

SB07-091

General Requirements

Pursuant to the requirements of Colorado Senate Bill 07-91, the map shall include existing generation and transmission lines and potential renewable resource generation development areas within Colorado that have potential to support competition among renewable energy developers for development of renewable resource generation projects.

SB 91 Objectives

- Identify Colorado's Renewable Energy Resources
- Assemble Renewable Resource Information
- Create the Colorado Renewable Resource Generation Development Areas Map

The 16-member TF was appointed by the Governor, the President of the Senate, and the Speaker of the House

- **Frank Prager** of Englewood, vice president of environmental policy for Xcel Energy.
- **Rick Gilliam** of Broomfield, director of western states policy with SunEdison.
- **Dan McClendon** of Montrose, general manager of Delta-Montrose Electrical Association.
- **Ronald L. Lehr** of Englewood, former Public Utilities Commission chairman and current wind energy consultant.
- **George R. Smart** of Fort Collins
- **Tony P. Frank** of Denver, director of renewable energy development for the Rocky Mountain Farmers Union.
- **John R. Bleem** of Fort Collins, a division manager for the Platte River Power Authority.
- **Craig Cox**, Interwest Energy Alliance
- **Mac McLennan**, Tri-State Generation and Transmission Association
- **John Nielsen**, Western Resource Advocates
- **Ron Larson**, Colorado Renewable Energy Society
- **Barbara Walker**, Independent Bankers of Colorado (appointed by the Senate President).
- **Sam Mamet**, Executive Director, Colorado Municipal League.
- **Glenn Gibson**, Larimer County Commissioner (designated by Colorado Counties Inc.).
- **David Hurlbut**, National Renewable Energy Laboratory (designated by the director of NREL).
- **Morey Wolfson**, Governor's Energy Office (designated by the Director of the Governor's Energy Office).

Budget

“The GEO may accept private gifts, grants, and donations”

Anticipated Expenditures \$31,700

Donations: \$36,000

Schedule

- Four month program
- Four TF meetings
- Maps and accompanying document completed no later than December 31, 2007

Task Force Meetings

- **August 6**
- **September 10**
- **October 15**
- **November 19-**
 - Final meeting
 - Review progress since the October meeting,
 - Receive public comment
 - complete the TF work

Deliverables

- Maps of solar, wind, geothermal, biomass, and small hydro
- Analytical document
- Online access to the data

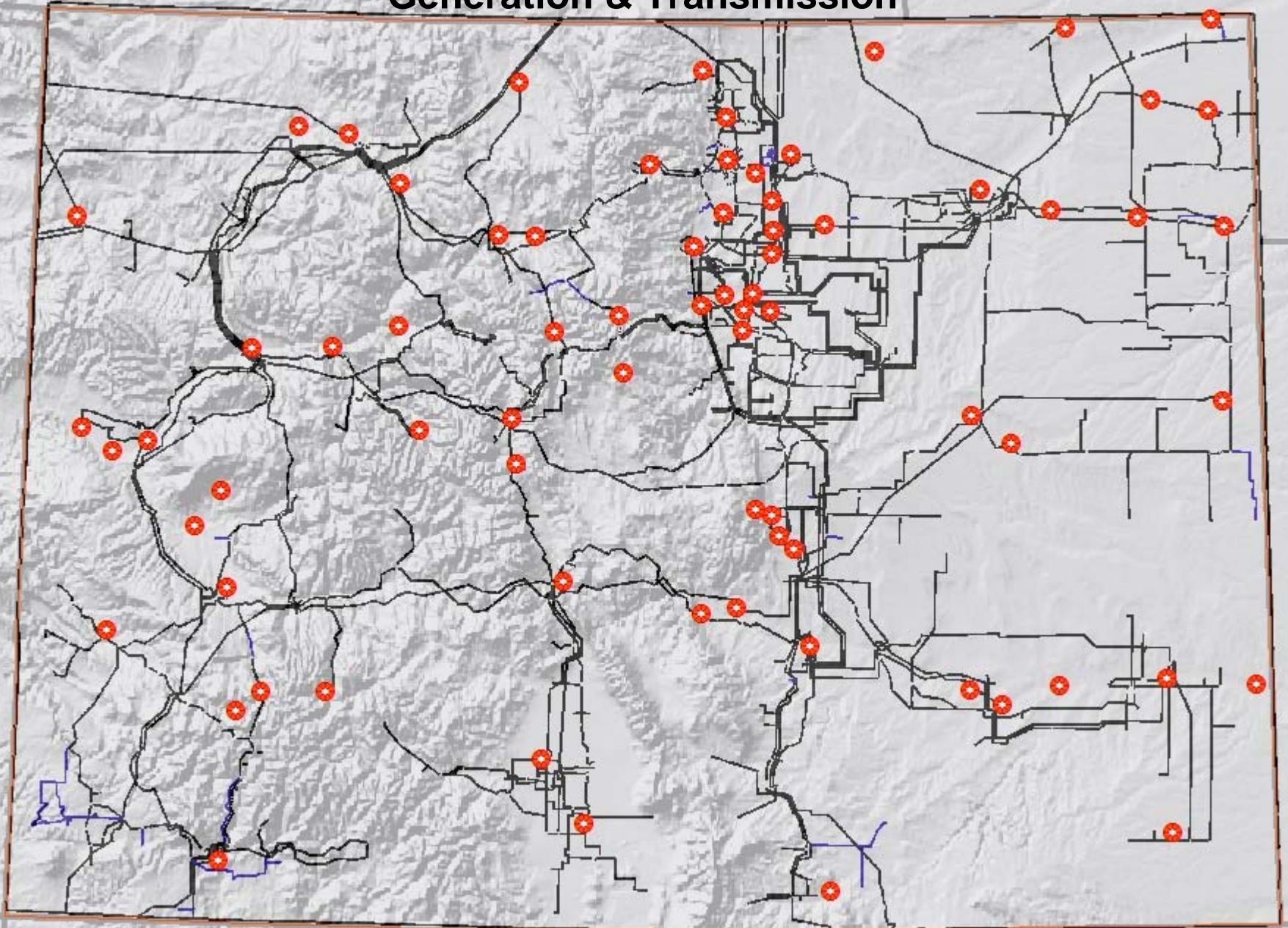
Mapping Project Focus

- Potential use of enterprise zones in the development of renewable resource generation development areas;
- Transmission needs of the renewable resource generation development areas to locations in which customers can use the renewable resources; and
- Potential development of various renewable resources, including, but not limited to, wind, solar, hydropower, biomass, biofuel, ethanol, and geothermal resources.

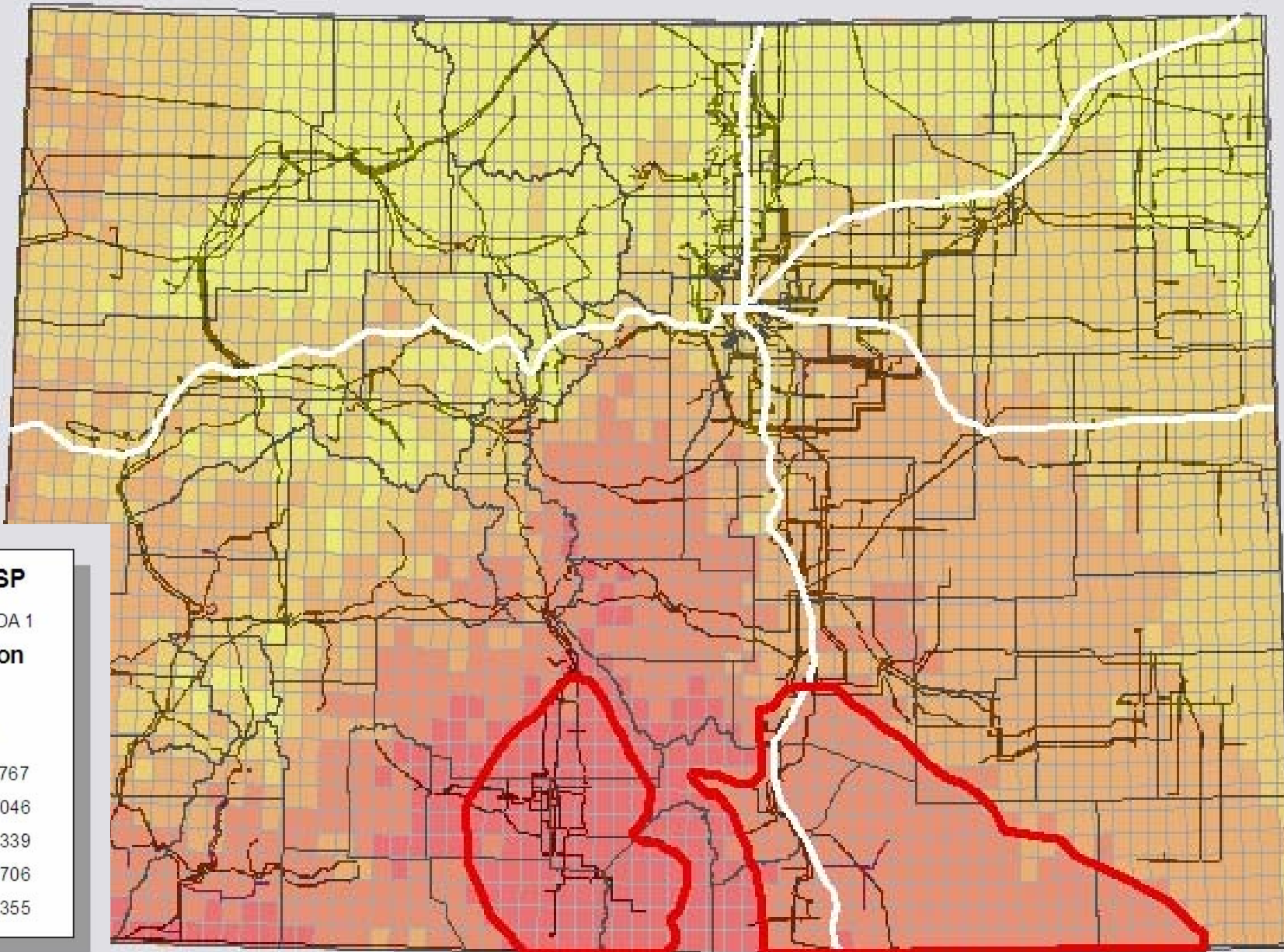
Approach

The work uses geographic information systems (GIS) to map renewable energy resource areas for the state. GIS work uses land features and scientific modeling results (like solar and wind studies) to describe locations suitable for renewable resource development areas.


Generation & Transmission



Draft Solar GDA








Solar CSP

 Solar GDA 1

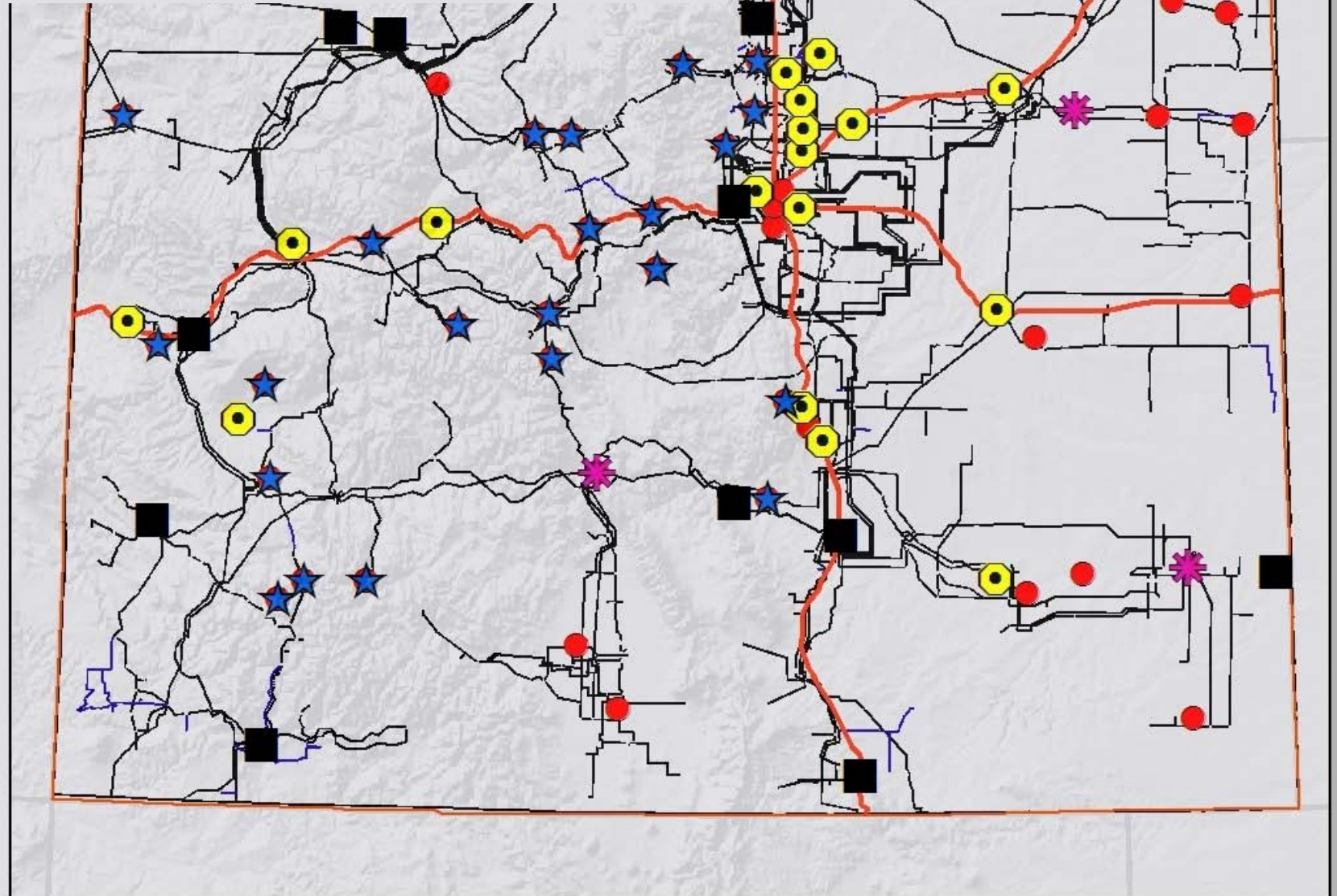
Transmission

Solar Annual DNI

	5311 - 5767
	5767 - 6046
	6046 - 6339
	6339 - 6706
	6706 - 7355

Generation >10MW

- Coal Generation
- ★ Hydro Generation
- Other - Generation
- ✱ Wind Generation
- Gas Generation



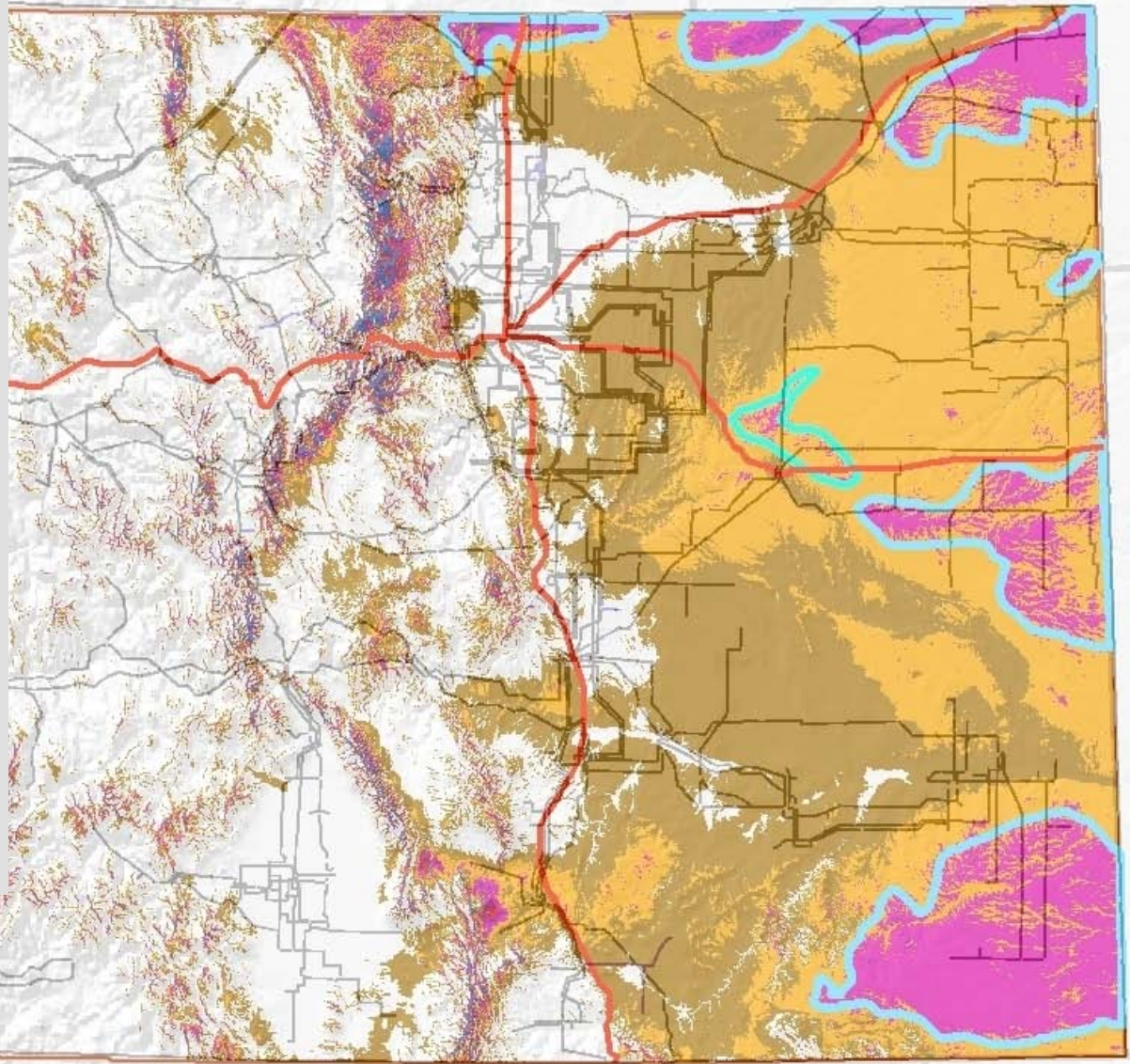
WIND

-  WIND GDA 1
-  WIND50WPC7
-  WIND50WPC6
-  WIND50WPC5
-  WIND50WPC4
-  WIND50WPC3
-  WIND50WPC2

Transmission



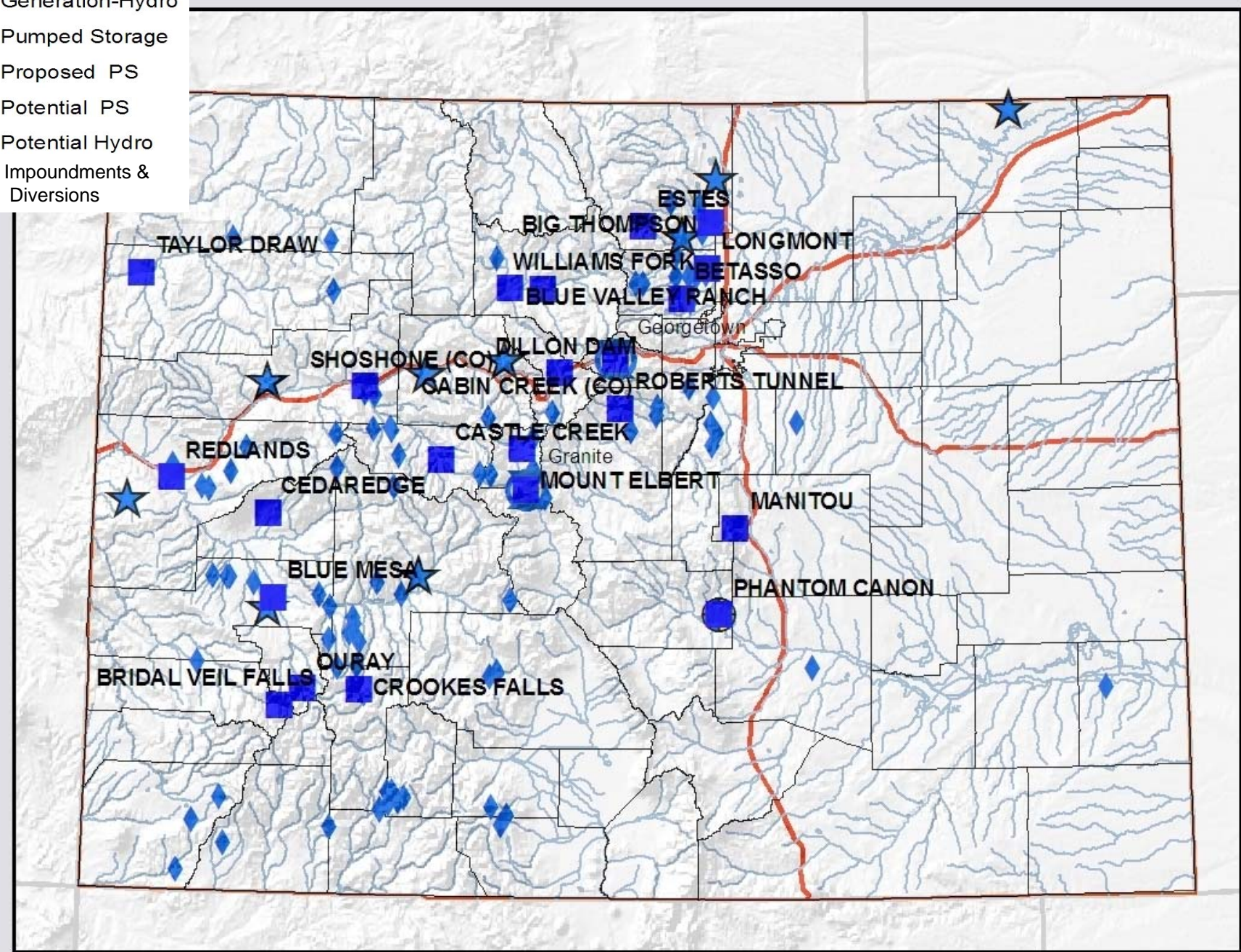
Draft Wind GDA



Hydro Generation

- Generation-Hydro
- ⊗ Pumped Storage
- ⊕ Proposed PS
- ★ Potential PS
- ◆ Potential Hydro Impoundments & Diversions

Draft Hydroelectric Generation



Geothermal

Draft Geothermal GDA

Geothermal Heat Flow

AVG_HF__mW_m2_

• 30 - 80

• 80 - 115

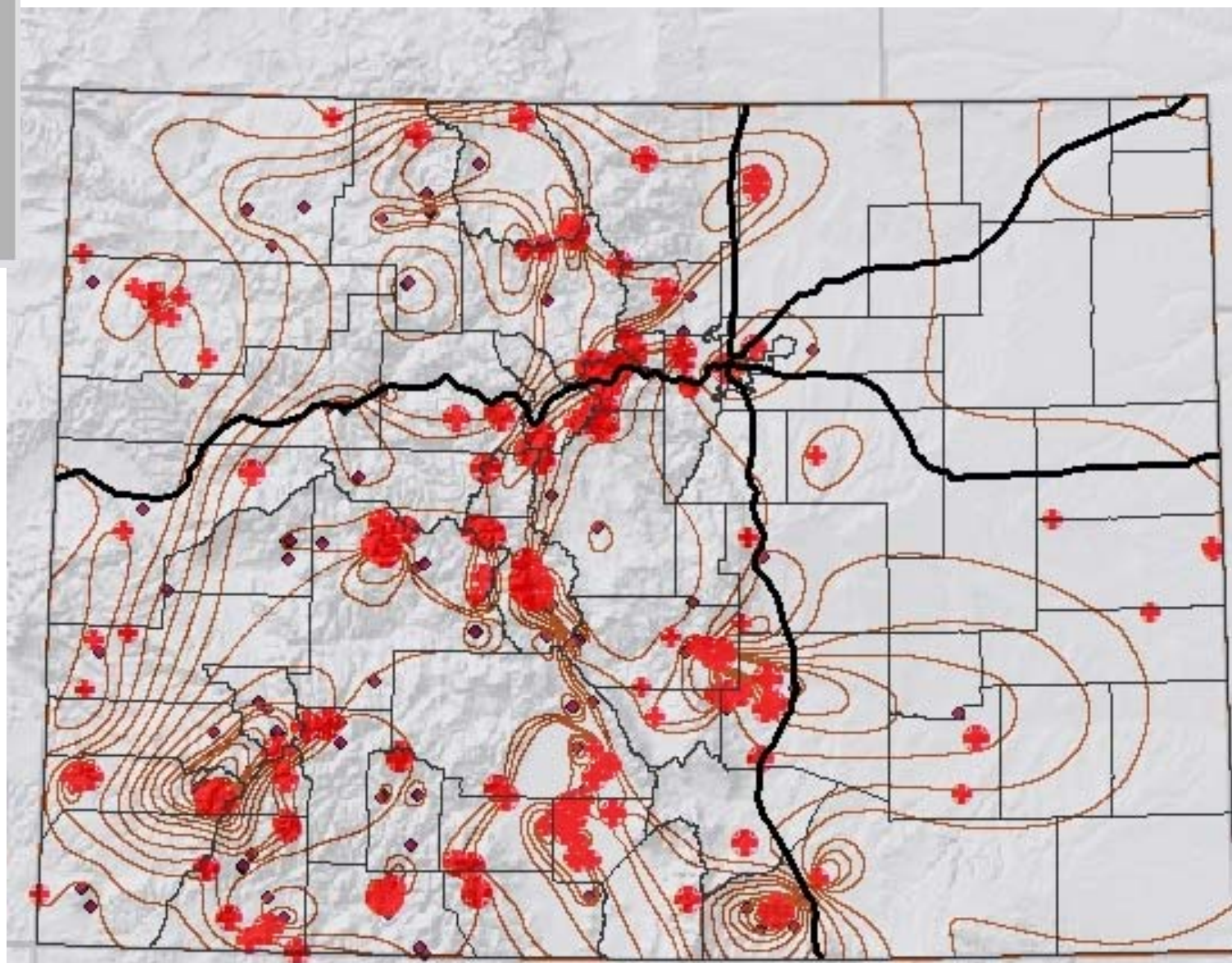
• 115 - 159

• 159 - 242

• 242 - 377

— Heat Flow Contours

• Thermal Springs



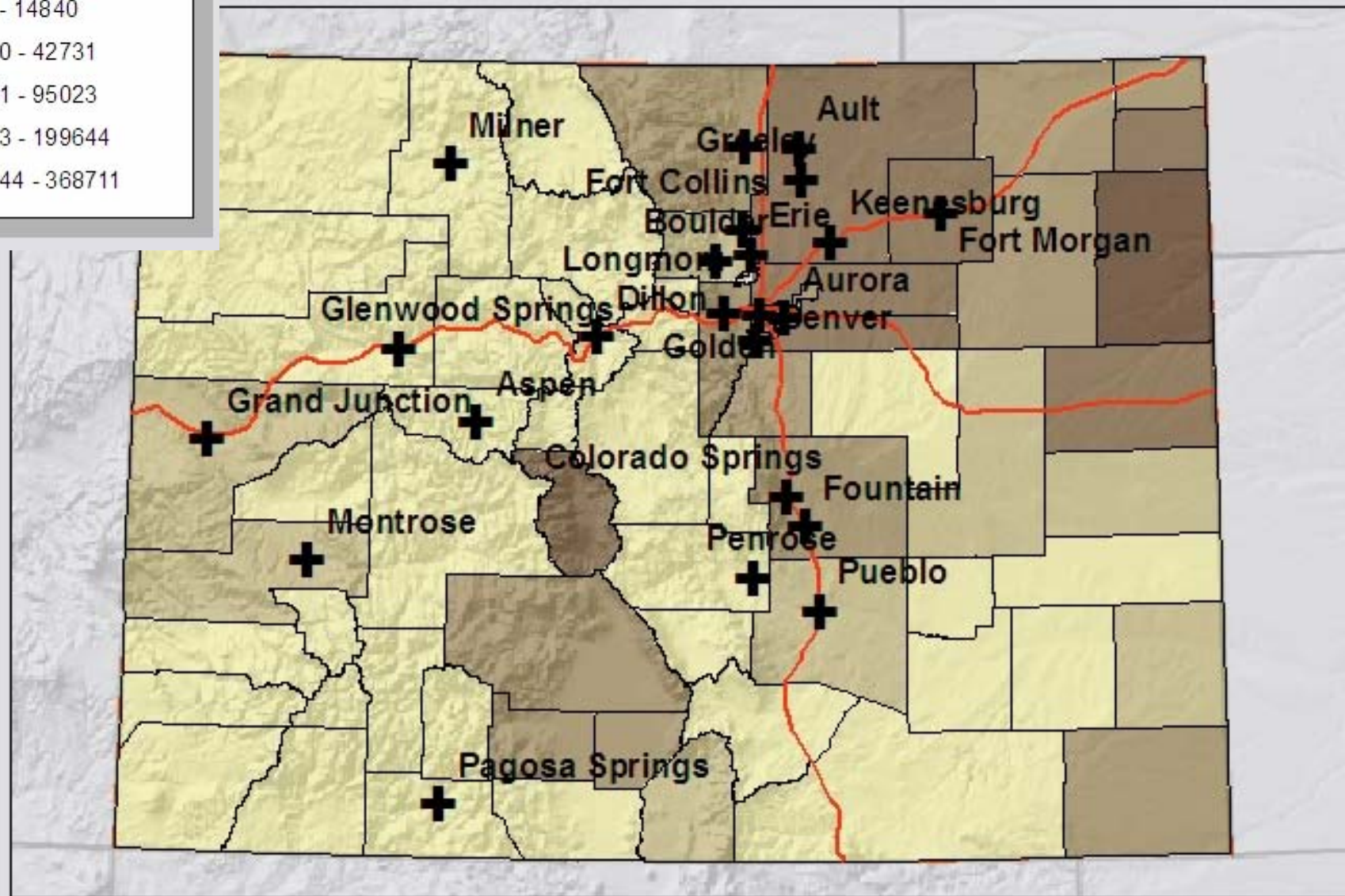
Draft Biomass GDA

Biomass

⊕ EPA_LMOP_Landfills

□ counties

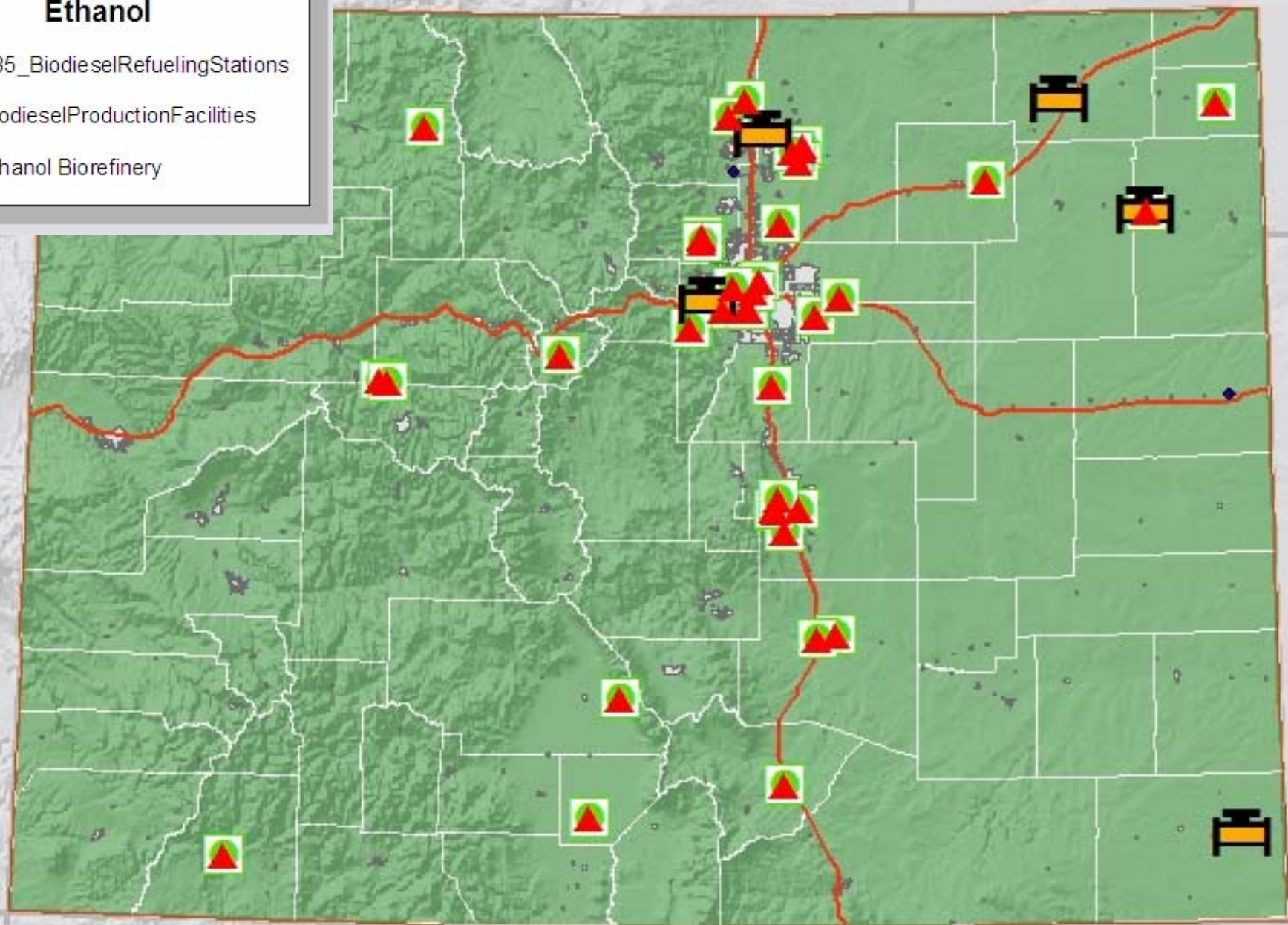
Total Dry Tons



Draft Ethanol and Biodiesel

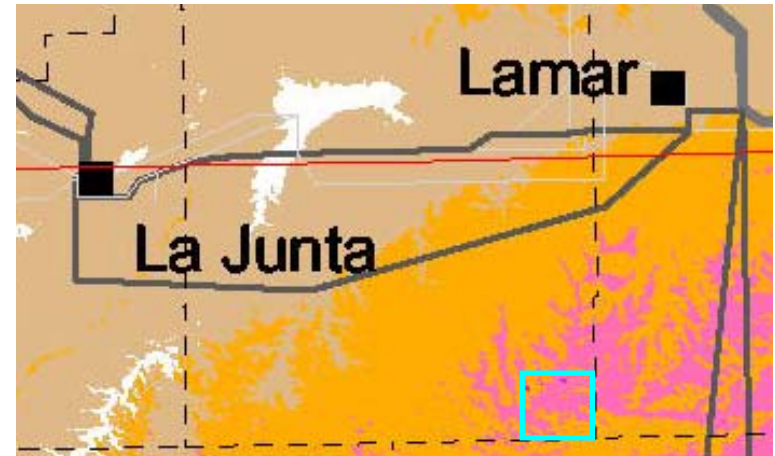
Ethanol

- ▲ E85_BiodieselRefuelingStations
- ◆ BiodieselProductionFacilities
- 🏭 Ethanol Biorefinery



Estimate Renewable Energy Potential

- Summarize areas after screening
- Estimate installed capacity
- Estimate renewable generation



Example: Blue outlined area on map, assume 5 MW per sq. km installed wind capacity and 35% annual average capacity factor

Class 3 or better resource = 100 sq. km.

*Installed capacity = 100 sq. km. * 5 MW/sq. km = 500 MW*

*Annual average generation = 500 MW * 35% * 8760 hrs/yr
= 1,533,000 MWh/yr*

Draft Table of Contents

Executive Summary

Introduction

SB91 Legislation, appointment of Task Force, SB91 process

Related legislation

TF timeline, meetings, public comment

Demand

Colorado's existing generation and transmission

Future Colorado generation and transmission

Overview of renewable energy generation technology

Colorado renewable energy- background and future

Colorado Wind

Colorado Solar

Colorado Hydroelectric

Colorado Geothermal

Colorado Biomass

Colorado Ethanol

(cont'd)

Draft Table of Contents (continued)

Colorado demographic considerations

Economic considerations

Renewable Resource Generation Development Areas

Colorado's electric utility industry

Colorado electric regulatory structure

Colorado electric service territories

Colorado electric utilities profile (rates, growth)

Colorado's proposed renewable generation

Analysis

Existing incentives (renewable portfolio standard, net metering/rebates)

Process for renewables to enter the market

Renewable energy development opportunities

Topics for further study

Summary

Acknowledgments

Appendix: SB91 Legislation, fiscal note, Budget, Public Comment (hyperlink),

Minutes of the meetings (hyperlink), Citations

Thank you