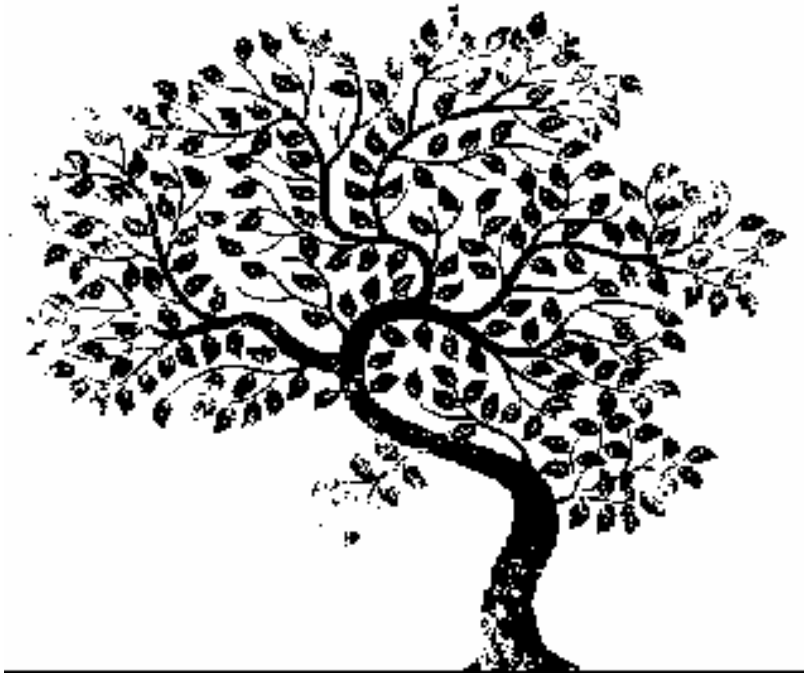
SCIENTIFIC SOLUTIONS FOR A BETTER ENVIRONMENT



INSTITUTE FOR
ENVIRONMENTAL SOLUTIONS

EMERGING
CONTAMINANTS

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THE TREE PROJECT
ENERGY • WATER • AIR

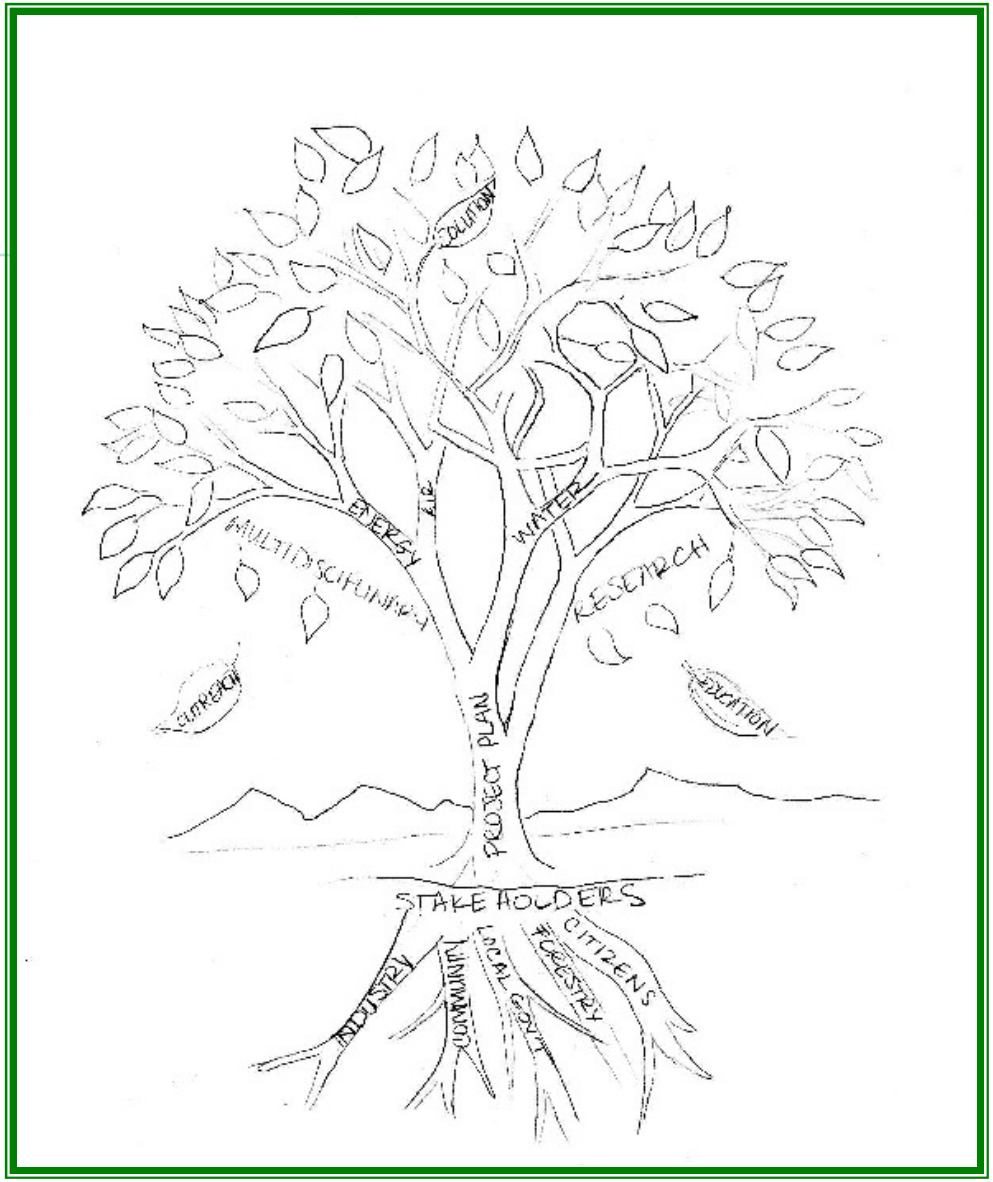
Institute for Environmental Solutions

Our Mission

Delivering proactive, technically sound solutions to complex environmental and natural resource problems - without unwanted side effects.

Our approach

- Stakeholder involvement
  - Uniting businesses, government, academia and communities
- Scientific integrity
  - Independent
  - Transparent
  - Multidisciplinary

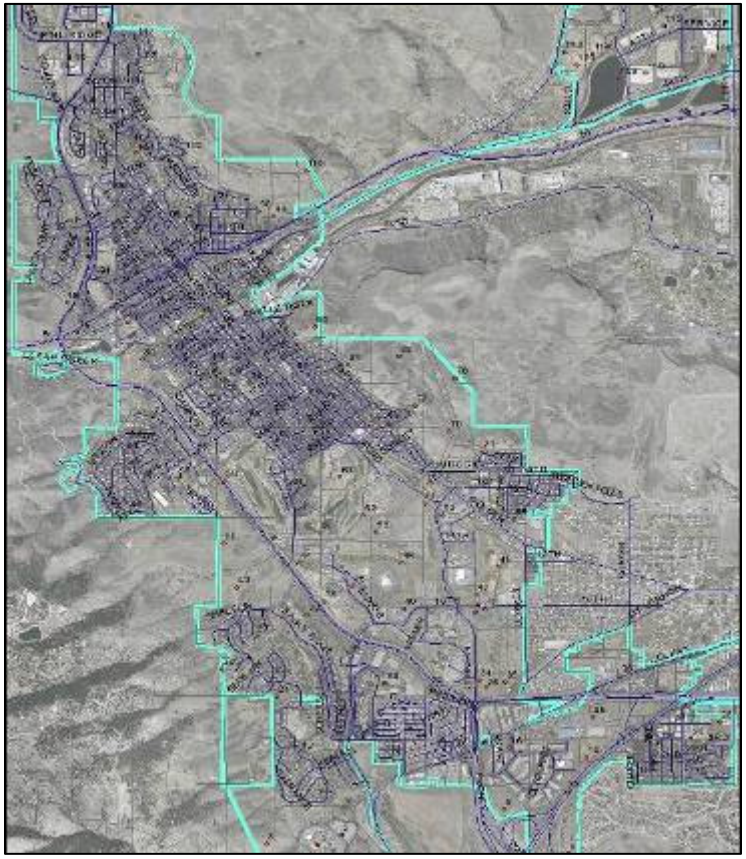


The Tree Project

- Identify how trees can optimize:
  - Air quality
  - Water conservation
  - Energy conservation
  - Carbon sequestration
- Pilot city: Golden

i-Tree urban forestry analysis

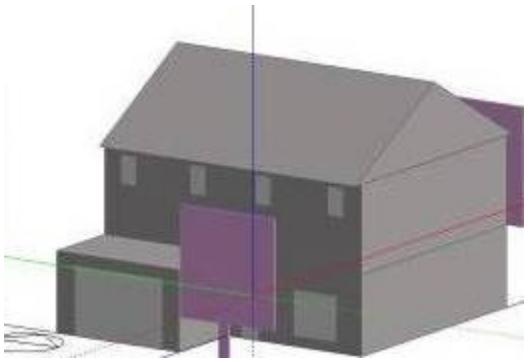
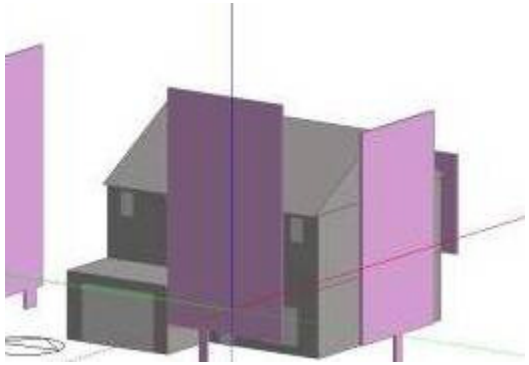
- 3-day field program
- 119 sample plots
- Determined:
  - Carbon sequestration
  - Air quality
  - VOC emissions
  - Energy



Trees and water conservation

- Evaluate trees' water conservation potential on irrigated lawns
- 14-day field program
- 1,344 soil samples

Trees and energy conservation

- Modeled real buildings to compare energy use under three landscape scenarios:
  - Existing trees
  - No trees
  - Additional trees

Trees: public attitudes and beliefs

- Survey data collection
- In person, at large public events
- Almost 300 completed
- Revealed barriers to tree planting

Results: impact of Golden's urban forest

Analysis	Results
i-Tree	Trees remove 10.5 metric tons of ozone air pollution per year and their annual carbon sequestration is equal to carbon emissions of 400 cars
Water	Soil beneath trees drier than similar treeless spaces; impact varies by species
Energy	Trees annual energy impact currently net negative but carbon and economic impact from energy demand effects net positive
Social	More environmental education is needed; 60% knew trees could mitigate global warming

Results: complex tradeoffs

- Potential Benefits
  - Summer energy conservation
  - Shading/water conservation
  - Improved air quality
  - Climate change mitigation
- Potential Costs
  - Winter energy consumption
  - Increased water consumption
  - Ozone air pollution
  - Carbon emissions associated with maintenance

The Tree Project's outcomes

- Detailed analyses of Golden's return on its investment in urban forestry
- Evaluation of trees' environmental tradeoffs
- ***First step in characterizing trees' impact on water conservation (positive or negative)***
- Strategic Plan for tree planting in Golden
- Model Municipal Environmental Tree Guidelines

Environmental tree table

Common Name	Air	Water	Energy	Carbon
Horsechesnut	X		X	X
Green Ash	X	X	X	X
White Fir	X			X
Hawthorn cultivars	X	X		X
Bristlecone Pine	X	X	X	X
Littleleaf Linden	X		X	X
Honeylocust	X	X		X
Kentucky Coffeetree	X	X	X	X

Current and future projects

- Urban forest environmental analysis
- TreeScapes
- Water research
- Carbon offsets

Urban forest environmental analysis

Partner with other Front Range communities to analyze and improve the urban environment

TreeScapes

- Online
- Interactive
- Environmental
- Room to grow

Water research goals

- Improve tree health and water conservation
- Prescribe optimal irrigation
- Characterize impact of trees in xeriscape

Carbon offset possibilities

- NCOC, Inc. debrief
- Front Range as national leader in urban forestry carbon offsets
- Source of revenue for urban forestry
- IES can organize and facilitate the collaboration

Tentative timeline

Summer/Fall 2008	Decide which communities will participate
Summer 2009	Baseline tree data collection
Fall/winter 2009	Application to NCOC, Inc., CCX
Summer 2010	3rd party verification

Partners and friends of IES

Xcel Energy®

City of Golden

city of BOULDER colorado

Hardy Boy

NREL National Renewable Energy Laboratory
Innovation for Our Energy Future

TRI-STATE Generation and Transmission Association, Inc.
A Touchstone Energy® Cooperative

PLANT-IT 2020

COLORADO Pollution Prevention Advisory Board

smartwool

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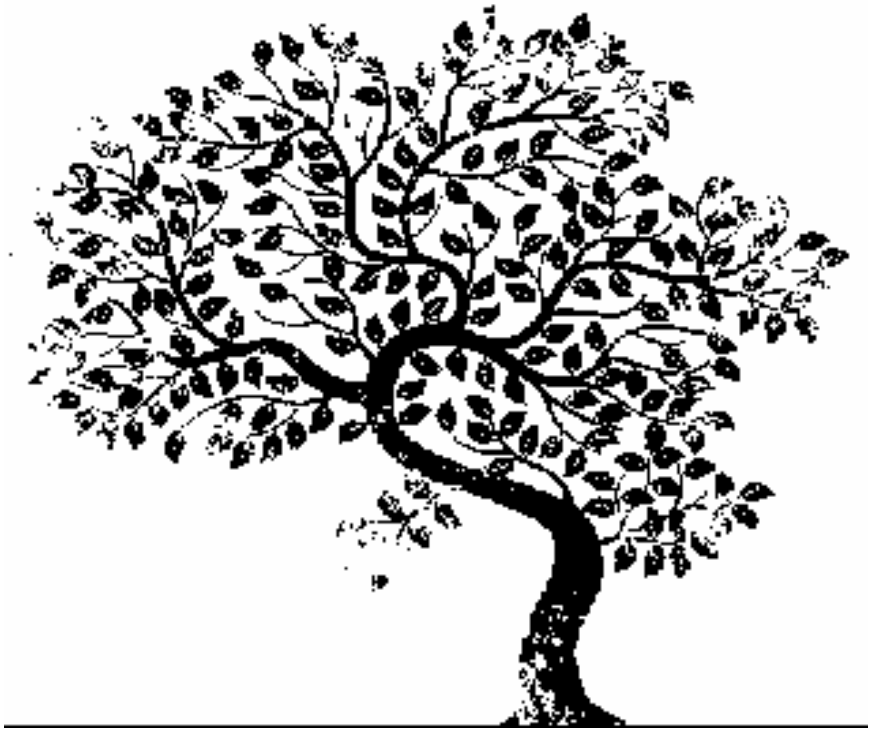
Questions?



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