CI-WATER
A Utah-Wyoming Cyberinfrastructure Water Modeling Collaboration

Petascale Hydrologic Modeling: Crossing the Digital Divide

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AAAS Review
17 Nov. 2014
Laramie, WY

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UNIVERSITY OF WYOMING
New Thinking

Located in Laramie, Pop. 30,000
#1-Ranked University in Terms of:

- Elevation (7200 ft)
- Percentage of students from small schools
- Petaflops per capita thanks to NWSC

New Center for Computational Hydrology and Hydrosciences, founded 2013.

New Engineering Initiative ($18M this biennium) plus new 100,000 sq. ft building addition.

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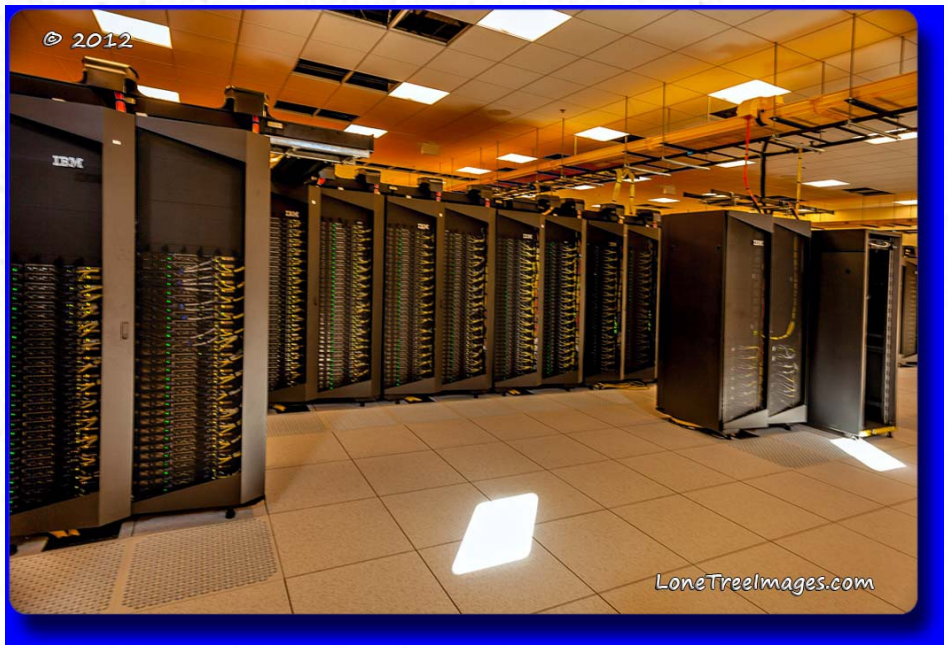
University of Wyoming
New Thinking

Computing Resources:

Mt. Moran Campus Cluster
3480 i7 cores
400 TB storage

NCAR-Wyoming Supercomputing Center (NWSC)
~74,000 i7 cores

UWyo allocation 20%




Mt. Moran, Teton Range, Wyoming

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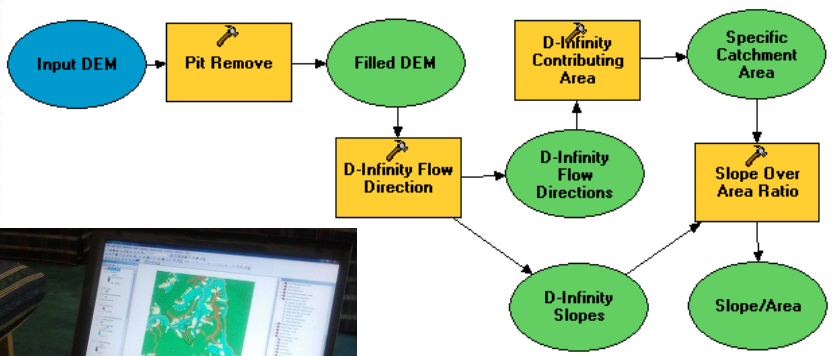
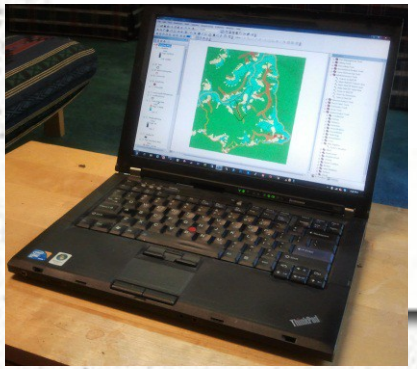
EPSCoR Wyoming

NSF

A Digital Divide

Researchers
- Experimentalists
- Modelers





HPC Specialists

#!/bin/bash vi chmod

#PBS -l nodes=4:ppn=8

grep awk mpiexec

```
-bash-3.2$ ls tddata
logan           LoganOutlet.sbn  LoganOutlet.shp      LoganOutlet.shx
LoganOutlet.dbf  LoganOutlet.sbx  LoganOutlet.shp.xml
-bash-3.2$ ls tddata/logan
logan.tif
-bash-3.2$ ls
eric    logMFfel      run.bash       taudem.bash    taudem_submit.sh
logMF   run_all.bash  run_taudem.sh  taudem.o41959  tddata
-bash-3.2$ run_taudem.sh pitremove -z logan -fel loganfel
-bash-3.2$
```

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CI-WATER Project

- NSF Cyberinfrastructure Cooperative Agreement joint between Utah and Wyoming EPSCoR jurisdictions. Total budget $6.0M

- Focused on acquisition of hardware, development of software, capacity building, education, and outreach.

- Sept. 1, 2011, - Aug. 31, 2015

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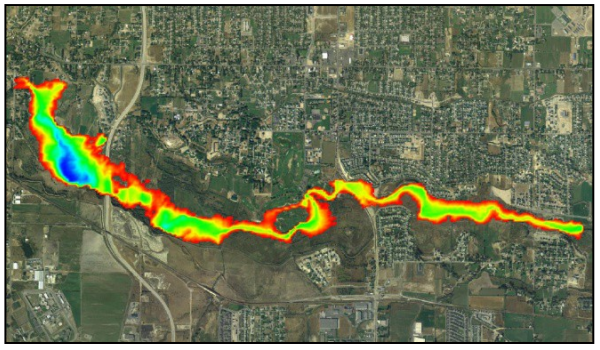
Project Objectives:

1. Enhance cyberinfrastructure facilities at collaborating universities.
2. Enhance access to data- and computationally- intensive modeling
3. Advance high-resolution multi-physics watershed modeling
4. Promote STEM learning and water science engagement across diverse groups



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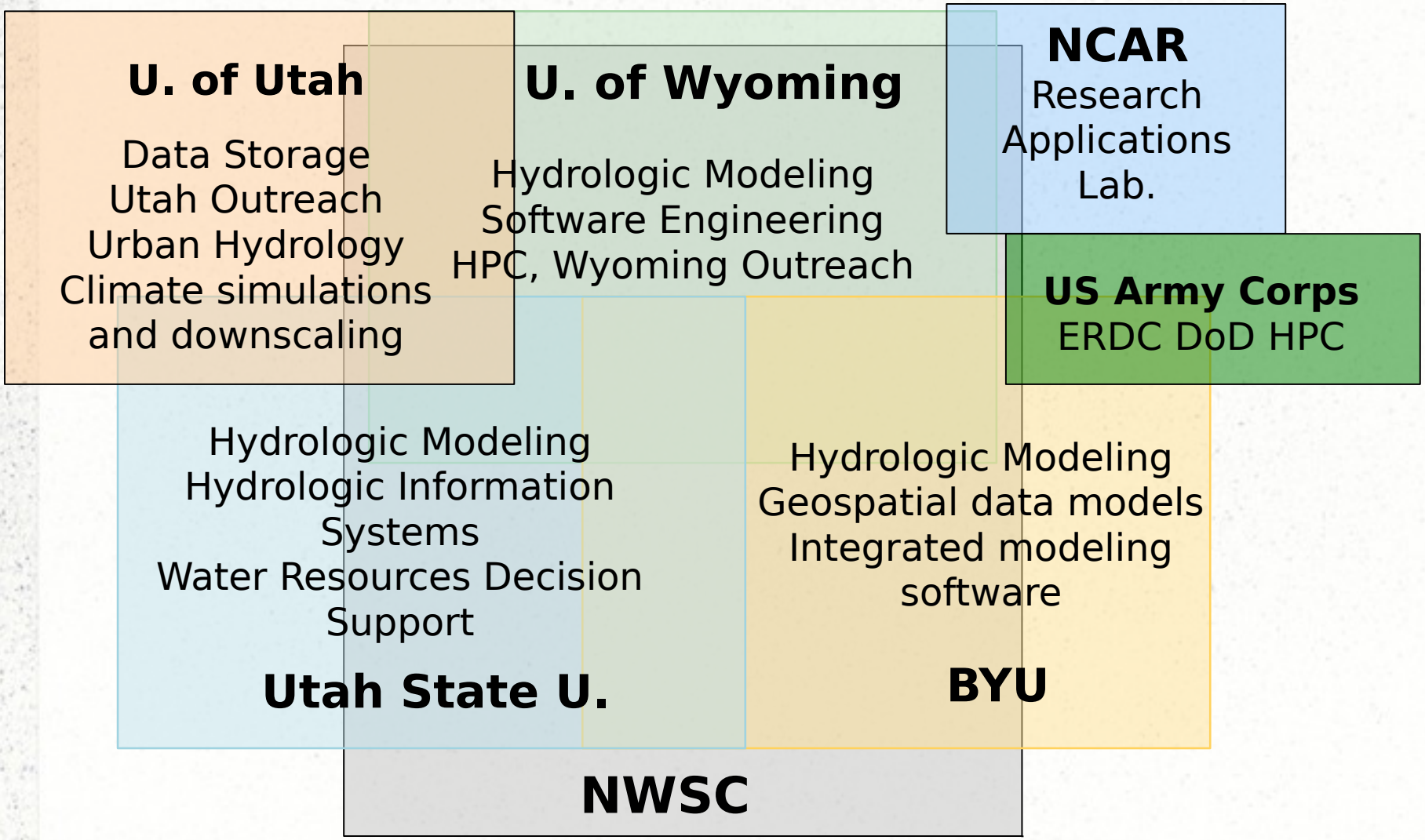
Team



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Enhance access to high-performance computing for water resources research, engineering, and management.

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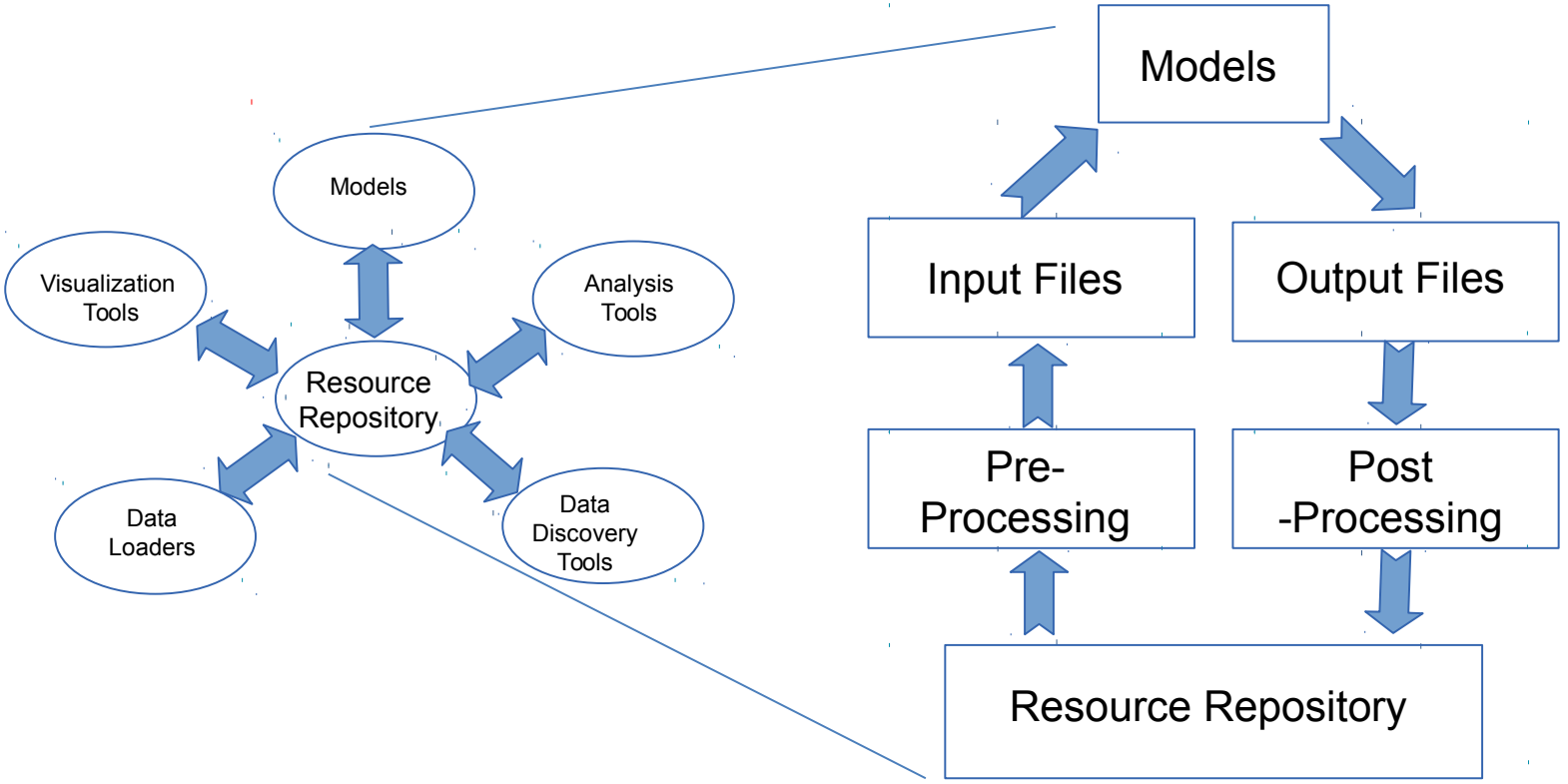
Pre- and post-processing work flows



- Each model interacts with information in the common data store
- The modeler does not need to be concerned with and can take advantage of standardized analysis, visualization loading and discovery tools

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Climate Modeling and Data Access

Hydrologic Model

GSSHA | **ADHydro**

Water Management Model

Demand/ Climate Scenarios

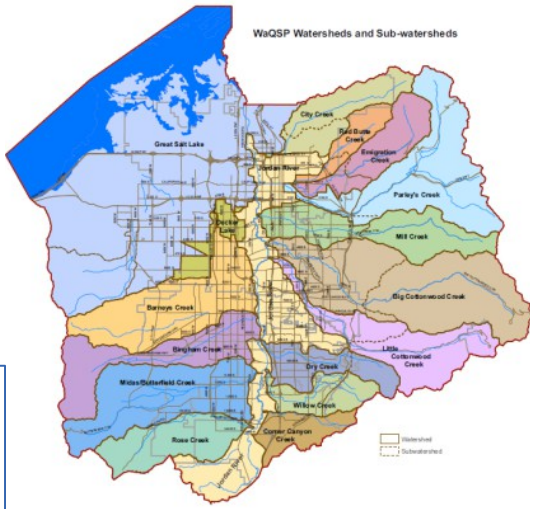
http://www.hiddenwaters.org/

Urban Stormwater Model

GoldSim

EPA SWMM

GSSHA



Water Quality Model

Demand/ Climate Scenarios

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What are the CI-WATER project expectations for this AAAS review?

1. Summative review of results and achievements to date.
2. Assessment of the intellectual merit and broader impacts of the project.
3. Strategic fidelity and impact of the research and development.
4. Value added.
5. Sustainability.

These shall be evaluated within the rationale for and evolution of the CI-WATER project over the award cycle.