RECOVER

Rehabilitation Capability Convergence for Ecosystem Recovery

An Automated Burned Area Emergency Response Decision Support System
for Post-fire Rehabilitation Management of Savanna Ecosystems in the Western US

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Overview

- RECOVER is a site-specific decision support system bringing together all the information necessary for post-fire rehabilitation decision-making.
- Designed in close collaboration with the US Department of Interior Bureau of Land Management (BLM) and Idaho Department of Lands (IDL).
- Uses rapid resource allocation capabilities of cloud computing to automatically gather data from various web services.
  - Earth observational data
  - Derived decision products
  - Historic biophysical layers
- Automated data assembly provides operational partners a complete and ready-to-use analysis environment customized for target wildfires.
- RECOVER is transforming this information-intensive process by reducing from days to a matter of minutes the time required to assemble and deliver crucial wildfire-related data.

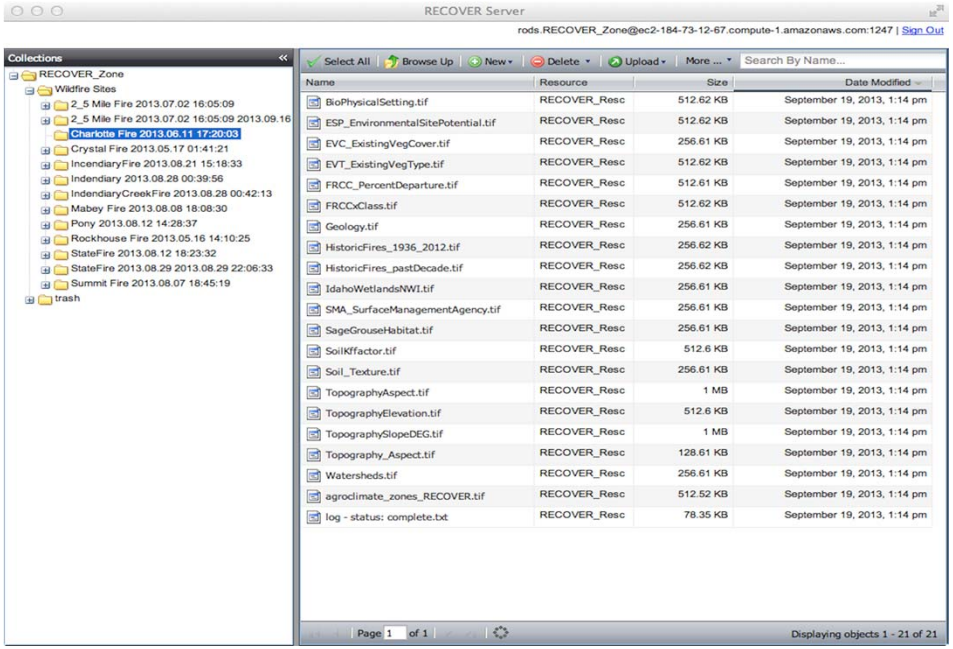
Conceptual Approach

- Technical Approach
  - The RECOVER DSS is composed of the RECOVER Server and the RECOVER Client.
  - RECOVER Server is a specialized iRODS data grid server deployed in the Amazon cloud.
  - RECOVER Client is a full-featured Adobe Flex Web Map GIS analysis environment.

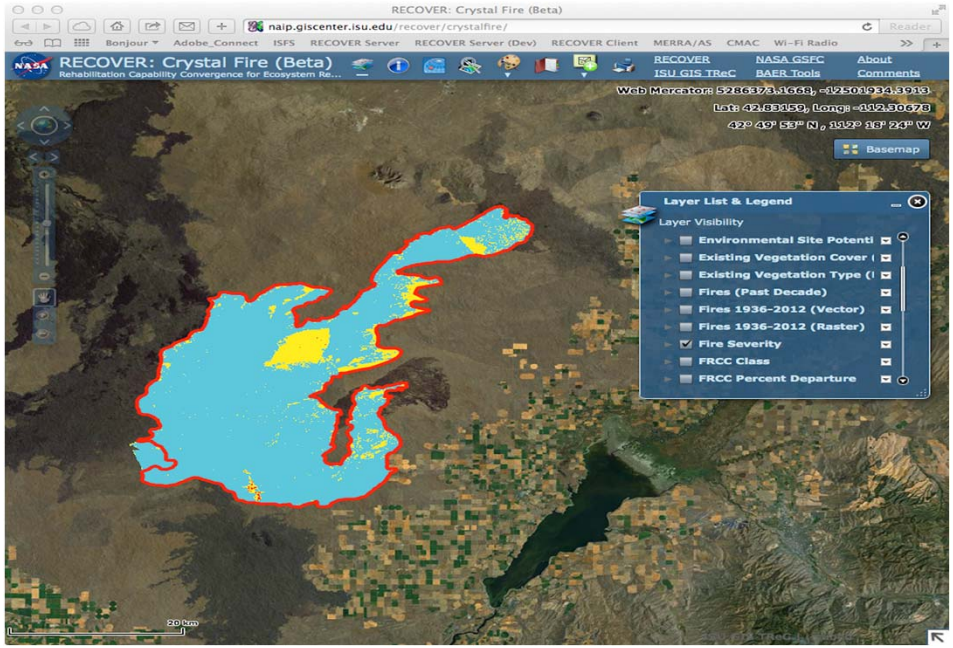
- Technical Innovations
  - Use of cloud computing — enables rapid development and cost-effective deployment.
  - Use of data grid technology — enables management of site-specific data in a single location.
  - Use of web services — enables rapid data gathering and the use of different types of clients (e.g. smartphones and tablets).

System Overview

RECOVER Server



RECOVER Client



For YouTube demonstrations, please see:

http://www.youtube.com/watch?v=LQKi3Ac7yNU	RECOVER Server
http://www.youtube.com/watch?v=SGhPpiSYpVE	RECOVER Client

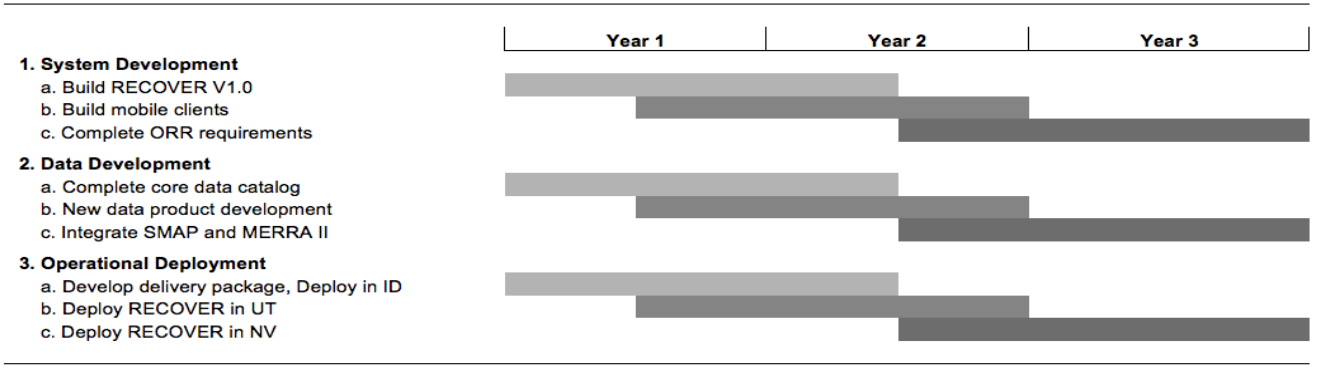
Feasibility Study 2013

- Project funded as a 1-year feasibility plus agency option for 3 years to implement
- More than a dozen agency collaborators participated in the Phase 1 feasibility study.
- The system was used in Idaho in six actual fires in the 2013 fire season.
- RECOVER's technical performance was outstanding, significantly reducing the time it takes to gather information.
- More than two dozen data layers assembled on average in 60 minutes.
  - ~ 90 sec. to automatically gather 20+ layers
  - ~ 60 min. to manually assemble the remaining specialized, site-specific layers

Fire	Start Date	End Date	Acres Burned	RECOVER Response Time (min)	RECOVER Client URL
Crystal	15-Aug-06	31-Aug-06	220,000	N/A	http://naip.giscenter.isu.edu/recover/CrystalFire
Charlotte	2-Jul-12	10-Jul-12	1,029	N/A	http://naip.giscenter.isu.edu/recover/CharlotteFire
2 ½ Mile	2-Jul-13	3-Jul-13	924	30	http://naip.giscenter.isu.edu/recover/2nHalfMileFire
Mabey	8-Aug-13	19-Aug-13	1,142	120	http://naip.giscenter.isu.edu/recover/MabeyFire
Pony	11-Aug-13	27-Aug-13	148,170	35	http://naip.giscenter.isu.edu/recover/PonyFire
State Line	12-Aug-13	18-Aug-13	30,206	40	http://naip.giscenter.isu.edu/recover/StateFire
Incendiary Creek	18-Aug-13	n/a	1,100	90	http://naip.giscenter.isu.edu/recover/IncendiaryFire
Ridgetop	28-Jul-12	n/a	16,616	4	http://naip.giscenter.isu.edu/recover/Ridgetop_v2fire/

Phase 2 Implementation

- Over the next three years, we propose to deploy RECOVER into operational use in the Western United States.
- Our primary customers will be BLM and the state-level agencies responsible for wildfire response, stabilization, and rehabilitation.
- We will expand our outreach to additional agencies within the US including the US Forest Service and the US Geological Survey.
- We will focus on enabling four key work processes: pre-fire, active-fire, and post-fire decision making and long-term recovery monitoring.



Phase 2 Implementation

- Cloud computing is key to our transition strategy.
- Our goal is to complete the prototype RECOVER Server in the Amazon cloud and explore migration of this prototype to the High Performance Science Cloud at NASA GSFC.
- Our approach will be to develop software, documentation, training materials, and data services that BLM and other agencies can use to deploy RECOVER in other states.
- By utilizing cloud technologies we have created a highly portable system that does not require user agencies to support high end computing resources.
- Data management structure developed in feasibility offers easy pathways to implement on additional pathways (pre-fire conditions, long term recovery)

Next Steps

- Harden server and client technologies to ensure that we can support the users.
- Expand relationships into states outside of the development region of Idaho.
- Expand awareness of the system to additional agencies including the US Forest Service and USGS.
  - Host a workshop with relevant agencies to show the capabilities of the system and elicit feedback to improve utility.
- Connect RECOVER with other relevant projects funded through Disasters program.
- Expand awareness of system to international community.

Acknowledgements

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- For more information on RECOVER feel free to to contact
  - Keith Weber (Principal Investigator) webekeit@isu.edu
  - John Schnase (Co-I and NASA Institutional PI) john.schnase@nasa.gov
  - Mark Carroll (Co-Investigator) mark.carroll@nasa.gov

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