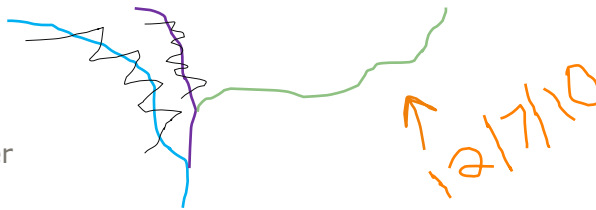


A Temporal Hydrologic Database for Rapidly Changing Landscapes

Using Mt. St. Helens in Washington as a Pilot Site

Adam Mosbrucker
Geog 575



BACKGROUND: Client / User

• U.S. Geological Survey – Cascades Volcano Observatory

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CVO;**'Who we are and what we do'**

- serve the public... live knowledgeably and safely... volcanoes and other natural hazards including... floods and debris flows
- goal is to provide **accurate** and **timely** information
- assess hazards **before** they occur by identifying and studying **past** hazardous events, their products, **ages**, and **areas** that would be affected by similar events in the **future**
- Study impact of... increased sediment transport on streams... and various other geologic or hydrologic processes on the landscape



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HYDROLOGIC

- Water quantity
 - Streams
 - Stream gauge/gage(s)
- Water quality
 - Temp, DO, pollution transport
- Channel cross sections (limited)



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HYDROLOGIC

- Water quantity
 - Streams
 - Stream gauge/gage(s)
- Water quality
 - Temp, DO, pollution transport
- Channel cross sections (limited)

CVO 'HYDROLOGIC'

- Water quantity
 - Streams
 - Stream gauge/gage(s)
- Water quantity
- **Sediment transport**
- **Geomorphology**
 - **Channel cross section (extensive)**
 - **Long-term landscape evolution**
- **Debris flows/lahars**



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BACKGROUND: Geographic

- pilot Site: Mt. St. Helens, Washington

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DESIGN OBJECTIVES: User-based !!

- data user

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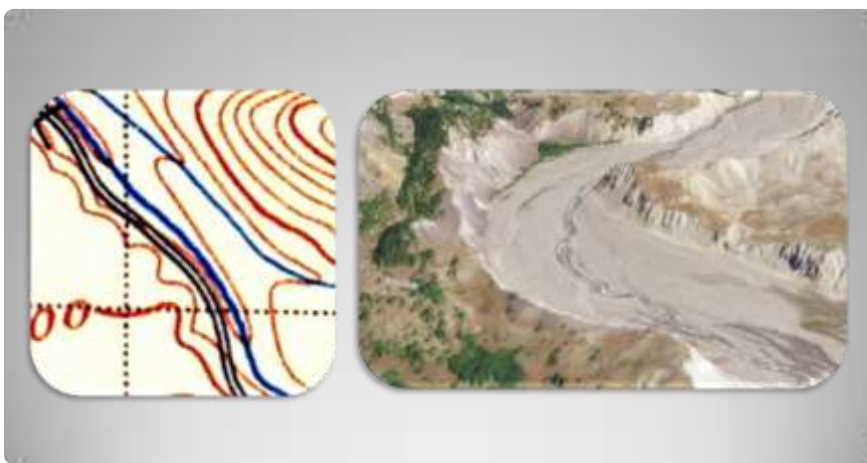
7

- Current channel locations?
- Historic channel locations?
- LiDAR data?
 - 'LiDAR maps'
 - (PDF, TIFF, JPG)
 - Data
 - ASCII, GRID
 - Dates?
 - Coverage?
- Temperature at Spirit lake?
- Elevation of cross section end points?
- Contributing terrain above each cross section?
 - (ie; watershed)
- HUC for old gage station?

Questions?

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DATABASE USERS: GIS-er

- purpose / data

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- Purpose:
 - Surface differencing
 - Glacier advance rate
 - Current channel locations?
 - Cross-section survey support
 - Modeling using LiDAR LAS files, GRIDs, derivatives (slope, aspect, etc.)
 - Watershed processes
- Data:
 - DTMs
 - Rasters
 - Terrain Models
 - Masspoints
 - Feature Classes
 - Ortho photos
 - Attributes!

User: GIS-er

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DATABASE USERS: Non-GIS-er

- purpose / data

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- Purpose:
 - Surface differencing
 - Glacier advance rate
 - Current channel locations?
 - Cross-section survey support
 - Modeling using LiDAR
LAS files, GRIDs,
derivatives (slope,
aspect, etc.)
 - Watershed processes
- Data:
 - DTMs
 - ASCII
 - Mosaic Dataset
 - Shapefiles
 - Ortho photos
 - Attributes

User: Non-GIS-er

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DATABASE USERS: GE-ers

- purpose / use

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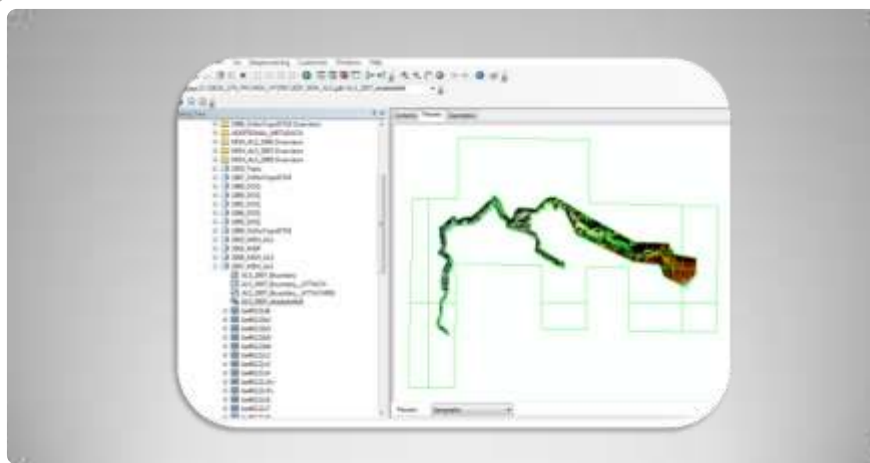
13

- | | |
|---|---|
| <ul style="list-style-type: none"> • Purpose: <ul style="list-style-type: none"> ◦ Visualization ◦ Current conditions <ul style="list-style-type: none"> • Weather • Stream flow ◦ Graphic / map creation | <ul style="list-style-type: none"> • Data: <ul style="list-style-type: none"> ◦ DTMs <ul style="list-style-type: none"> • TIFF, JPEG, etc. • Screenshots ◦ Ortho photos ◦ Feature classes with hyperlinks |
|---|---|

User: GE-er

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DESIGN OBJECTIVES: Designer

- data provider / database manager

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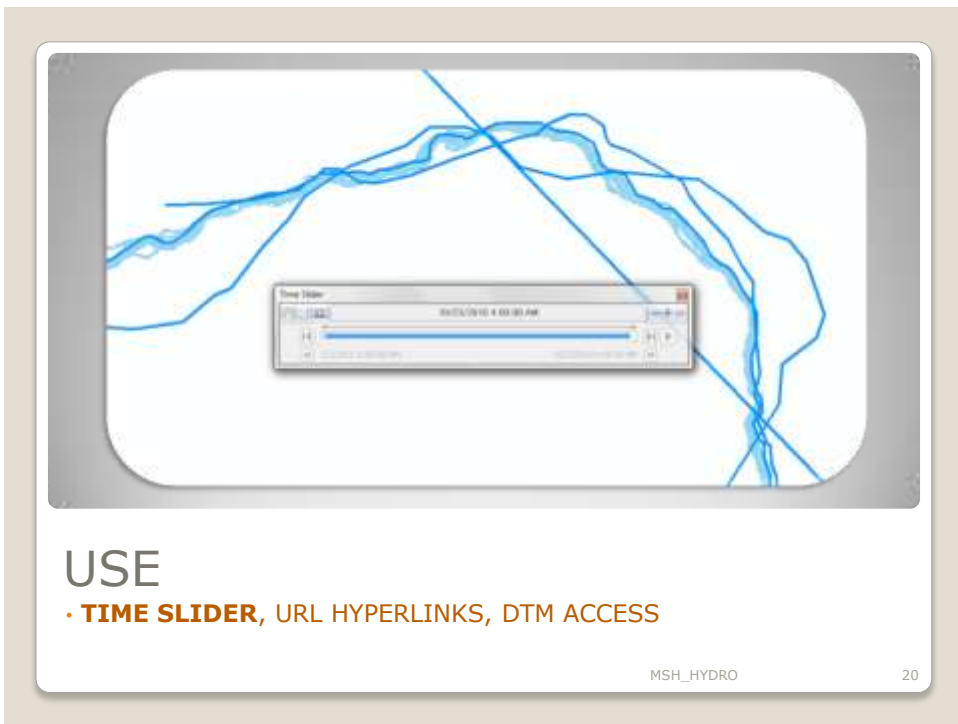
15

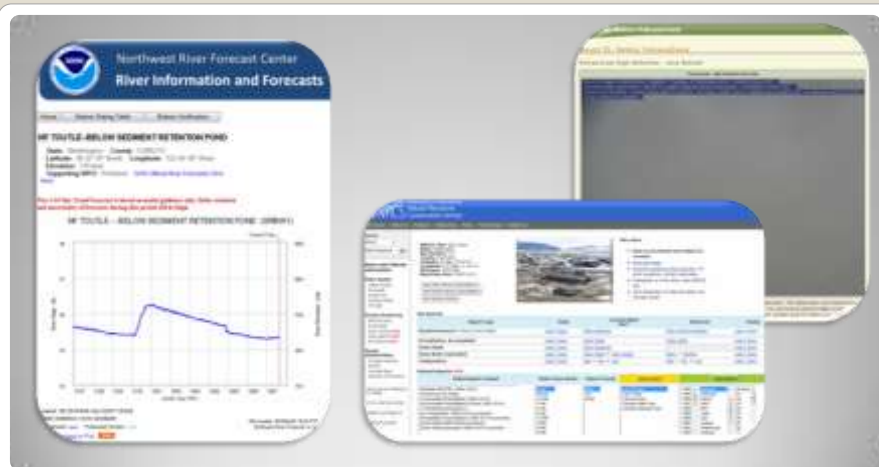
- Aggregate Data
 - Attachments
- Organized
- Expandable
- Distribute
- Metadata
- ESRI ArcGIS 10
 - Save space
 - Mosaic dataset
 - Terrain dataset
 - Lake of redundancy
 - Single manager/multiple users
 - Network

Design Objectives

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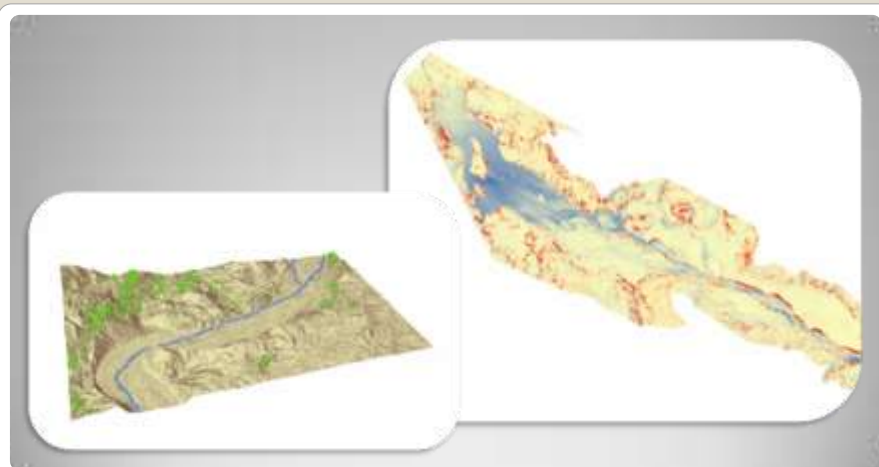


USE

- TIME SLIDER, **URL HYPERLINKS**, DTM ACCESS

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USE

- TIME SLIDER, URL HYPERLINKS, **DTM ACCESS**

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- ESRI platform (not open source)
- ArcGIS 10 (new)
- Metadata



LIMITATIONS/QUALITY:

- Platform, metadata

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DELIVERY !! 😊

- & TRAINING ☹️ 😊

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