

# The RECOVER Flex-Based Web Map Client

George Haskett

Research Assistant, ISU

Keith Weber, Tess Gardner

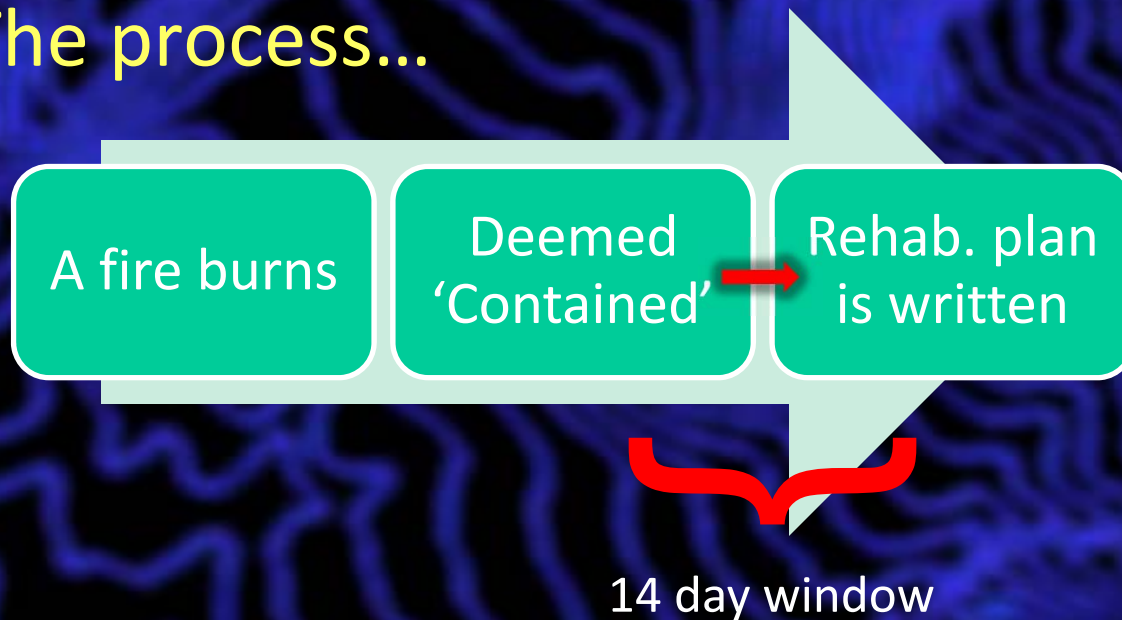
John Schnase, Roger Gill, Mark Carroll

Akiko Elders, and Molly Brown



# Post-fire Rehab. Planning

- The process...





# Primary Goal

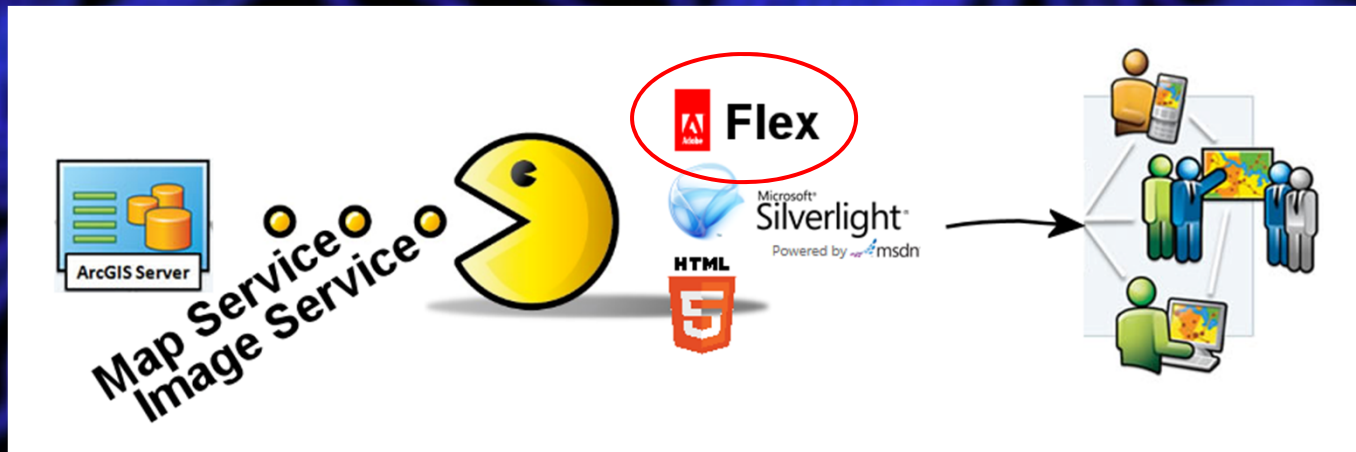
- To streamline the rehab planning process
- By providing:
  - Unified and efficient analytical tools
  - Collection of applicable up to date data
  - One stop solution (data & client)
- Resulting in a better informed decision

# Solution

- Event driven application
- Web-based interactive mapping client
- Client application is developed using Adobe Flex
- Consumes data from RECOVER iRODS server
- Ability to processes custom weighted values
  - Via the Multi-Criteria Evaluation (MCE) widget
- Thus allowing for a more efficient analysis



# Data Flow



Created

Consumed

Interacted

# Platform - Why Flex?

- Simple, yet highly functional platform
- **Minimal** download and installation requirements
  - Requires Adobe Flash plugin
- Low construction and maintenance costs
  - Eliminate additional out of office programming fees
  - Designed and maintained in house by graduate students
- Well established community of developers
- Large selection of pre-designed and enhanced widgets
- Ability to design custom widgets with little to no prior experience





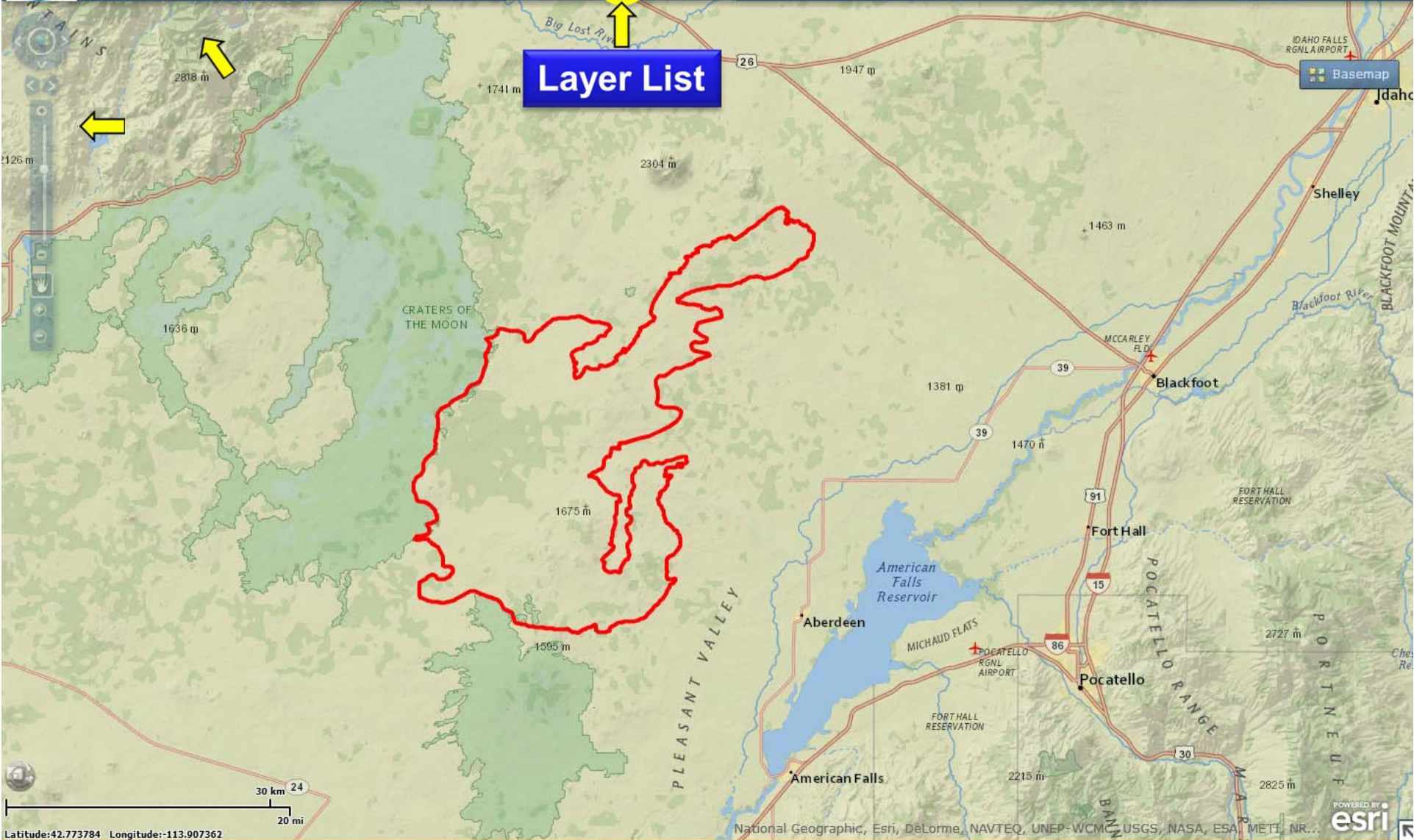
# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery

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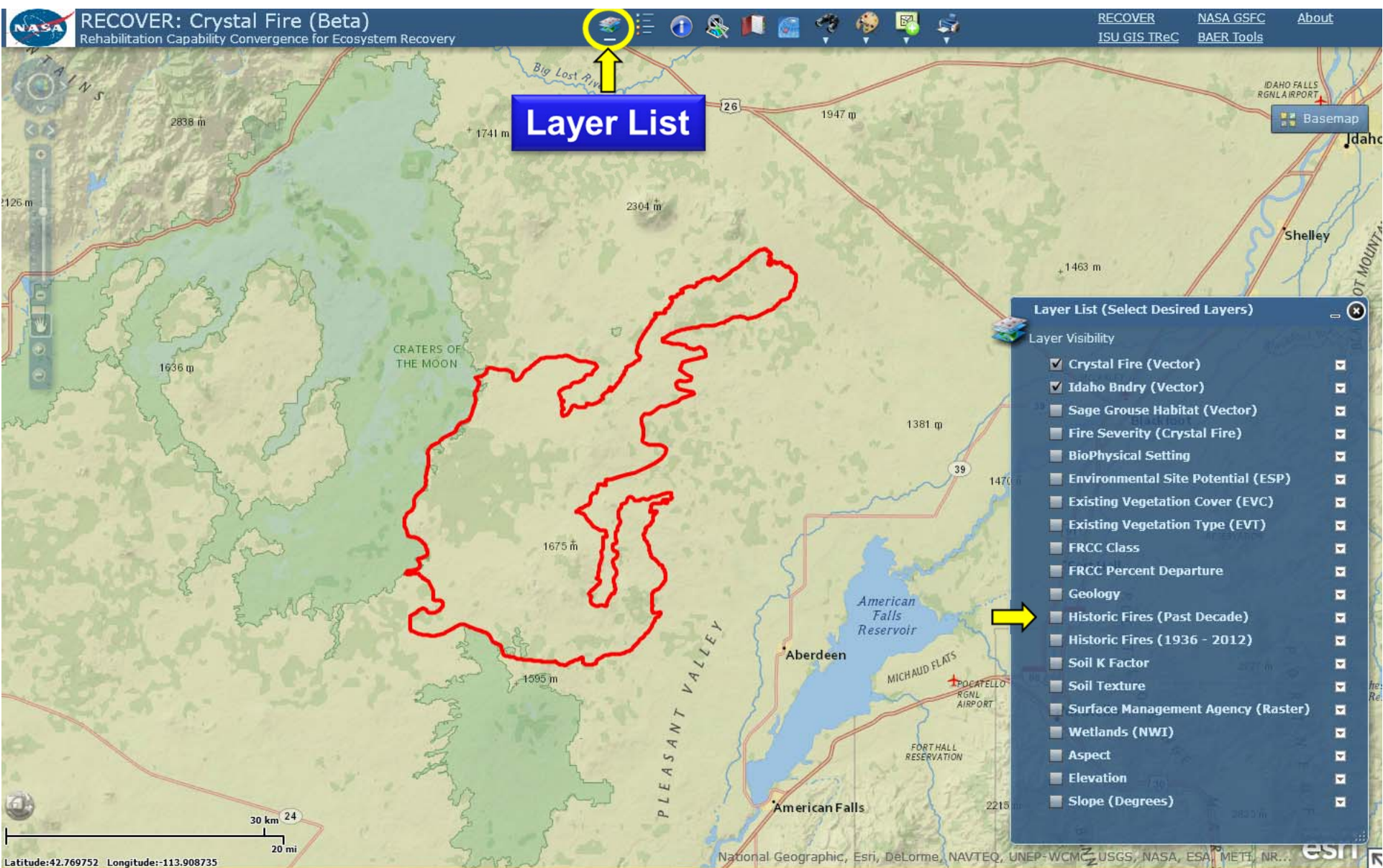
**Layer List**



Latitude: 42.773784 Longitude: -113.907362







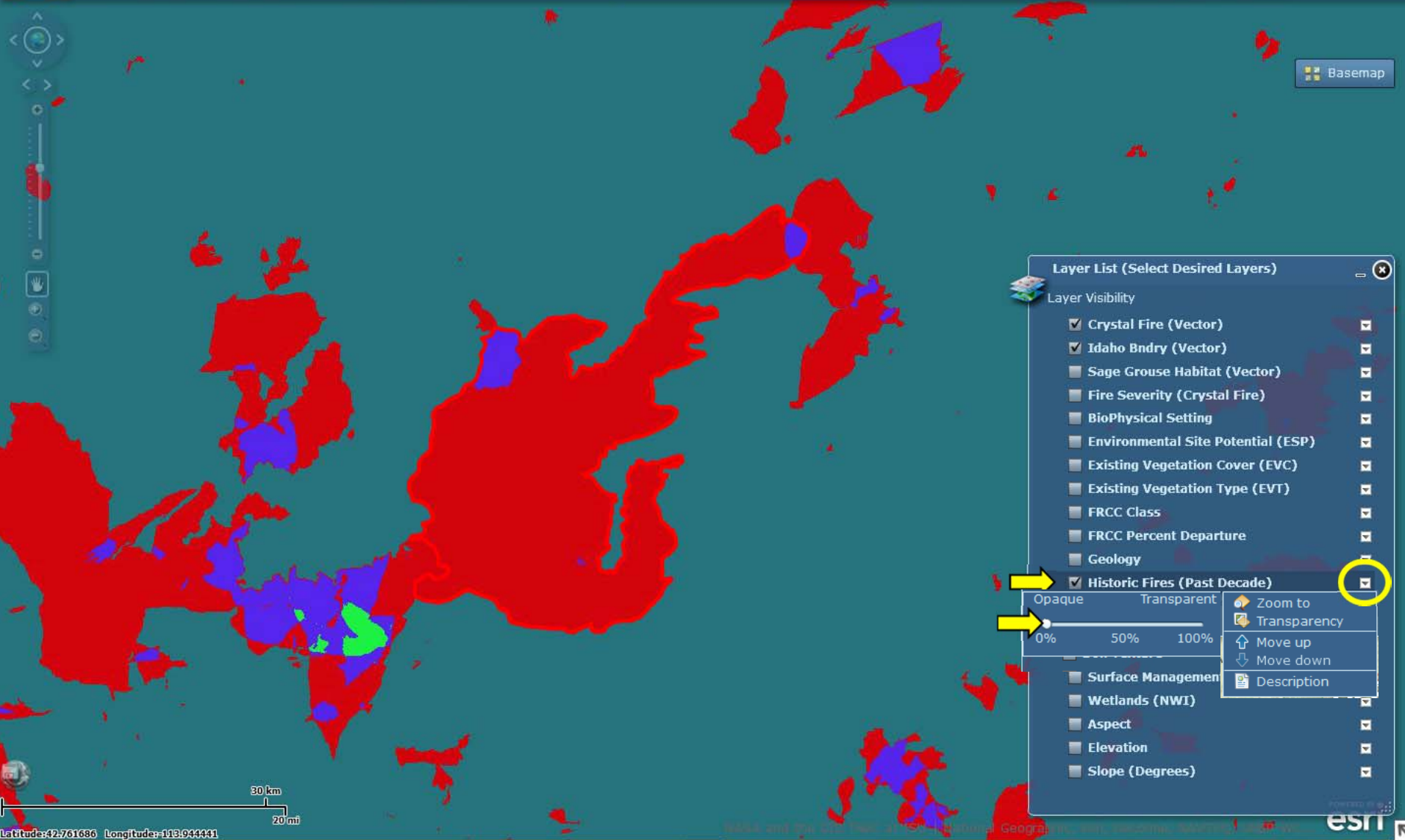
**Layer List**

**Layer List (Select Desired Layers)**

Layer Visibility

- Crystal Fire (Vector)
- Idaho Bndry (Vector)
- Sage Grouse Habitat (Vector)
- Fire Severity (Crystal Fire)
- BioPhysical Setting
- Environmental Site Potential (ESP)
- Existing Vegetation Cover (EVC)
- Existing Vegetation Type (EVT)
- FRCC Class
- FRCC Percent Departure
- Geology
- Historic Fires (Past Decade)
- Historic Fires (1936 - 2012)
- Soil K Factor
- Soil Texture
- Surface Management Agency (Raster)
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)







**ArcGIS REST Services Directory**

[Home](#) > [services](#) > [RECOVER](#) > [HistoricFires\\_pastDecade \(ImageServer\)](#)

[JSON](#) | [SOAP](#) | [WCS](#)

**RECOVER/HistoricFires\_pastDecade (ImageServer)**

**View In:** [ArcGIS JavaScript](#) [ArcGIS.com Map](#) [Google Earth](#) [ArcMap](#)

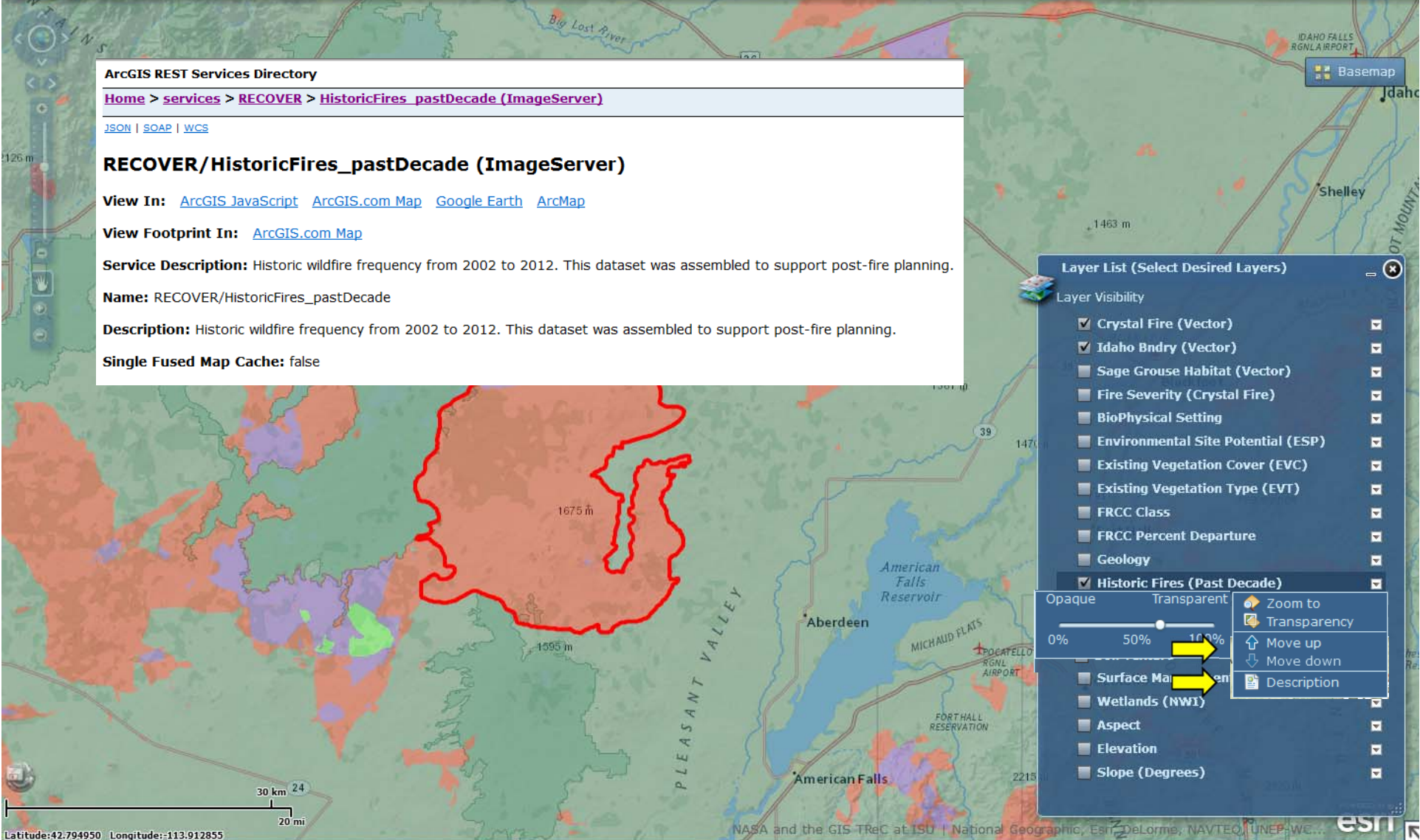
**View Footprint In:** [ArcGIS.com Map](#)

**Service Description:** Historic wildfire frequency from 2002 to 2012. This dataset was assembled to support post-fire planning.

**Name:** RECOVER/HistoricFires\_pastDecade

**Description:** Historic wildfire frequency from 2002 to 2012. This dataset was assembled to support post-fire planning.

**Single Fused Map Cache:** false



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- Existing Vegetation Type (EVT)
- FRCC Class
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- Geology
- Historic Fires (Past Decade)**

Opacity: Opaque Transparent (slider at 100%)

- Surface M...
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)





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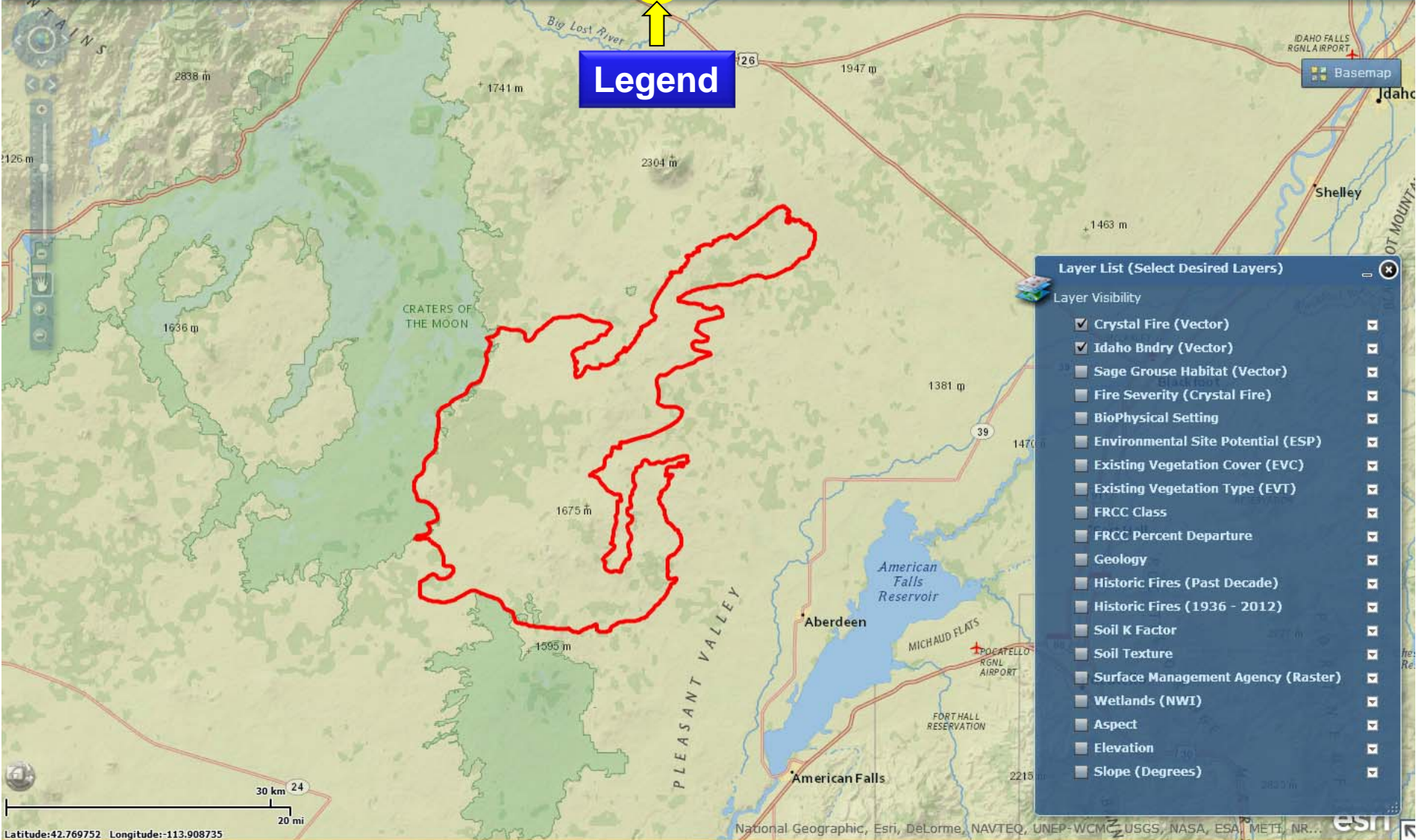
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**Legend**



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Latitude:42.769752 Longitude:-113.908735





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**Legend**

**RECOVER Legend**

- Crystal Fire (Vector)
- Idaho Bndry (Vector)

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- Slope (Degrees)

Latitude:42.761686 Longitude:-113.952681

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... ESRI





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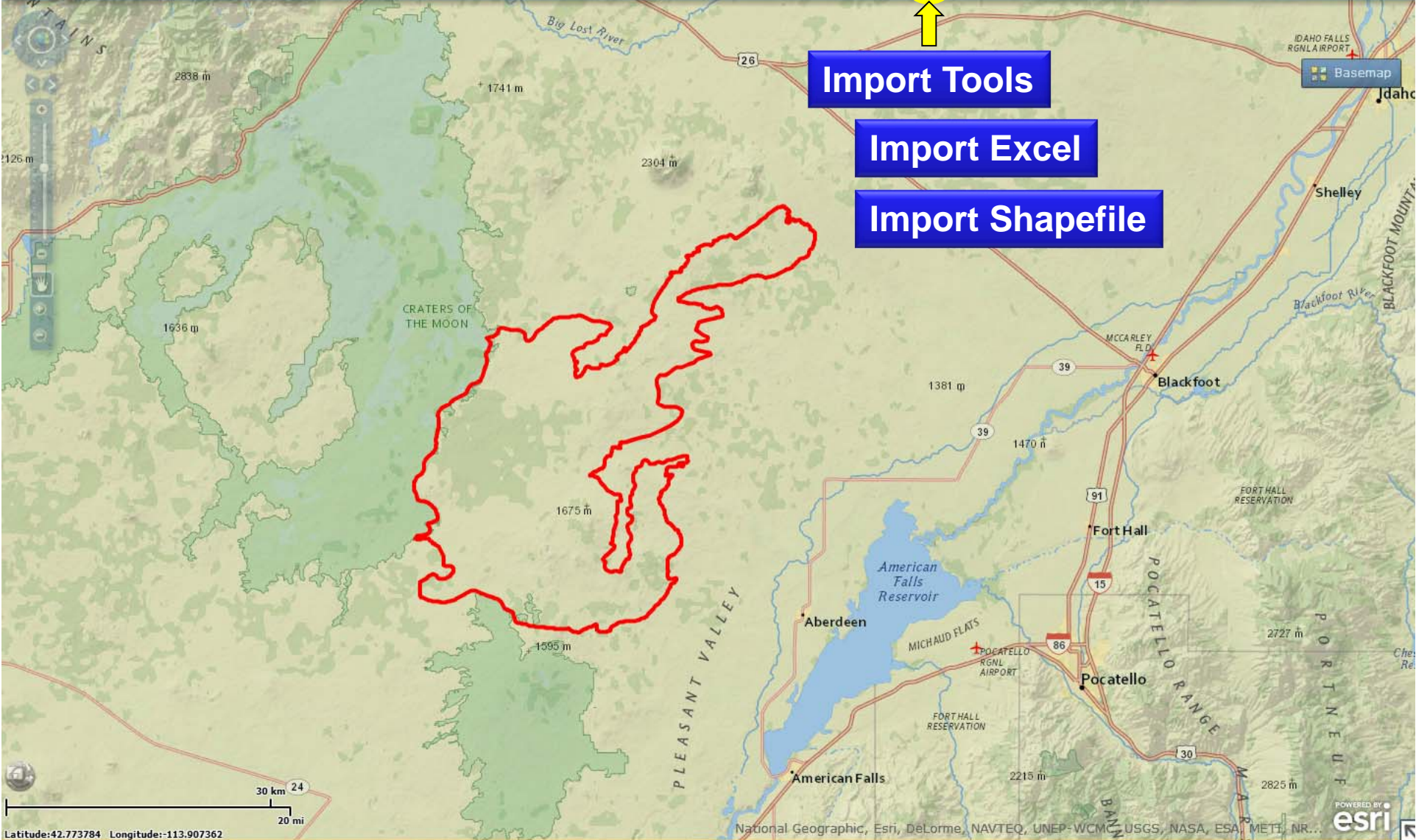
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**Import Tools**

**Import Excel**

**Import Shapefile**

Latitude:42.773784 Longitude:-113.907362

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... **esri**





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### Import Excel (Use WebMercator)

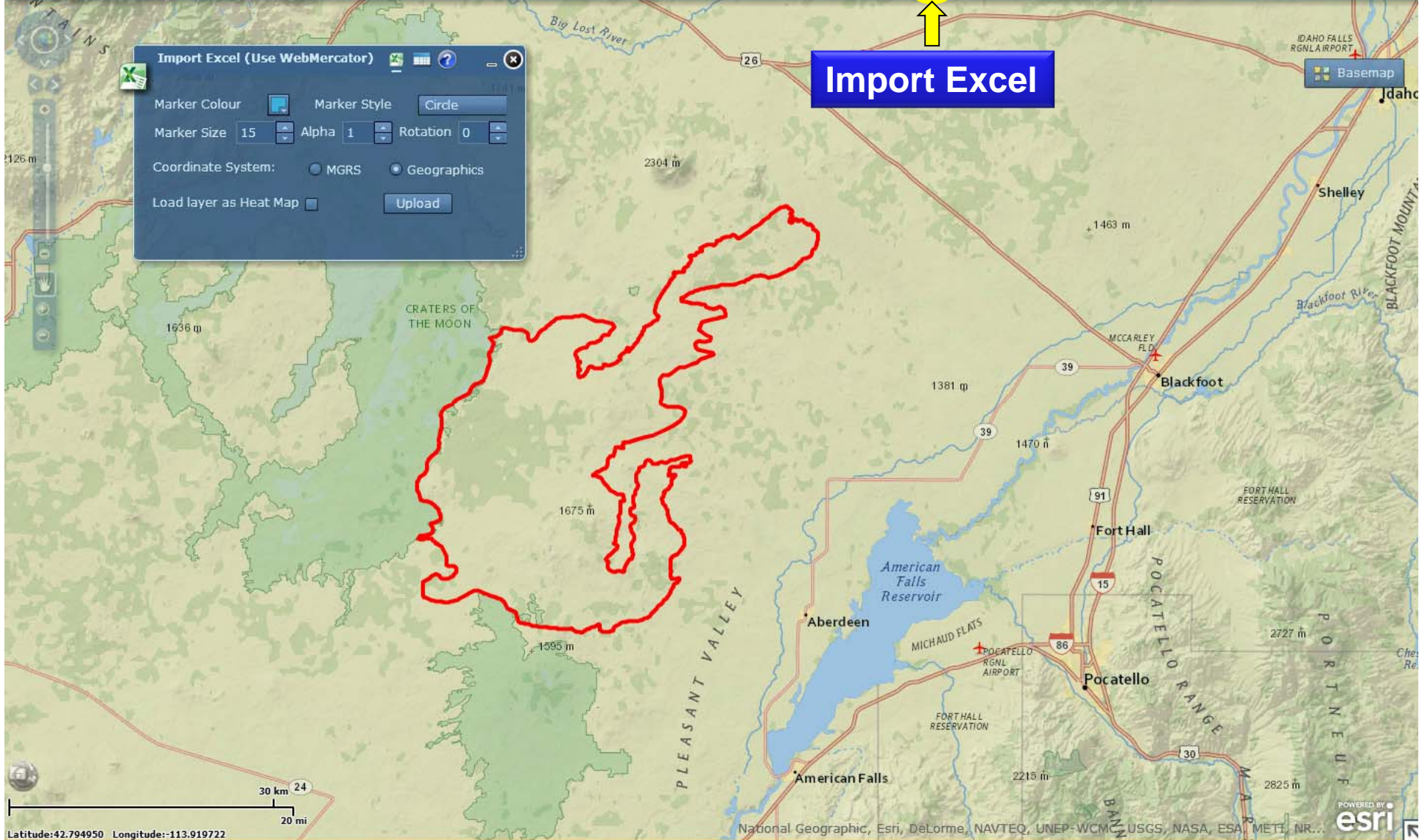
Marker Colour:  Marker Style:

Marker Size:  Alpha:  Rotation:

Coordinate System:  MGRS  Geographics

Load layer as Heat Map:

**Import Excel**



Latitude: 42.794950 Longitude: -113.919722





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**Import Excel (Use WebMercator)**

excel\_RECOVER\_test.xls

Number of Features: 2

Transparency:

Clear All Layers

**Photo**

TYPE: Pt of Interest

SOURCE: sltrib.com

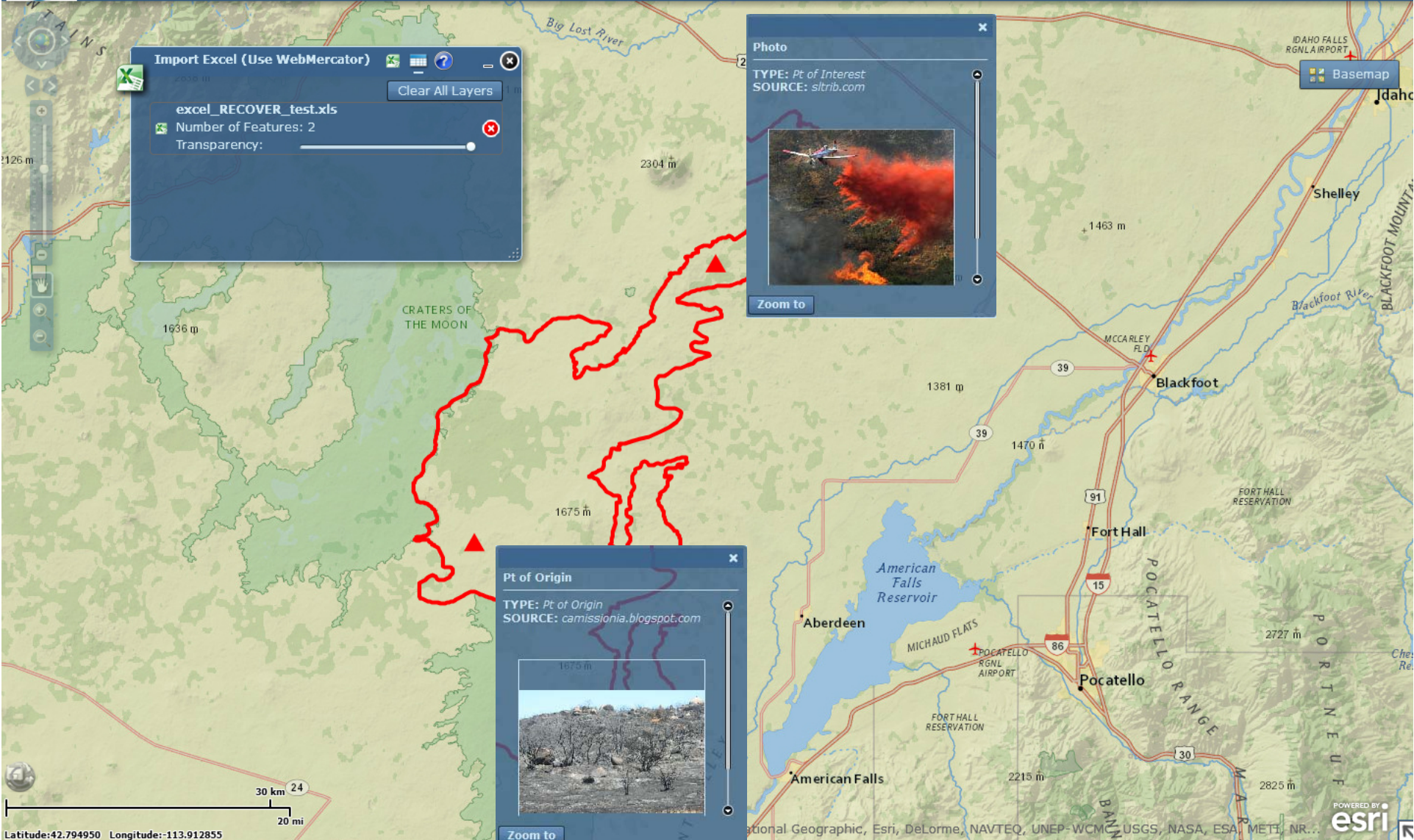
Zoom to

**Pt of Origin**

TYPE: Pt of Origin

SOURCE: camissionia.blogspot.com

Zoom to







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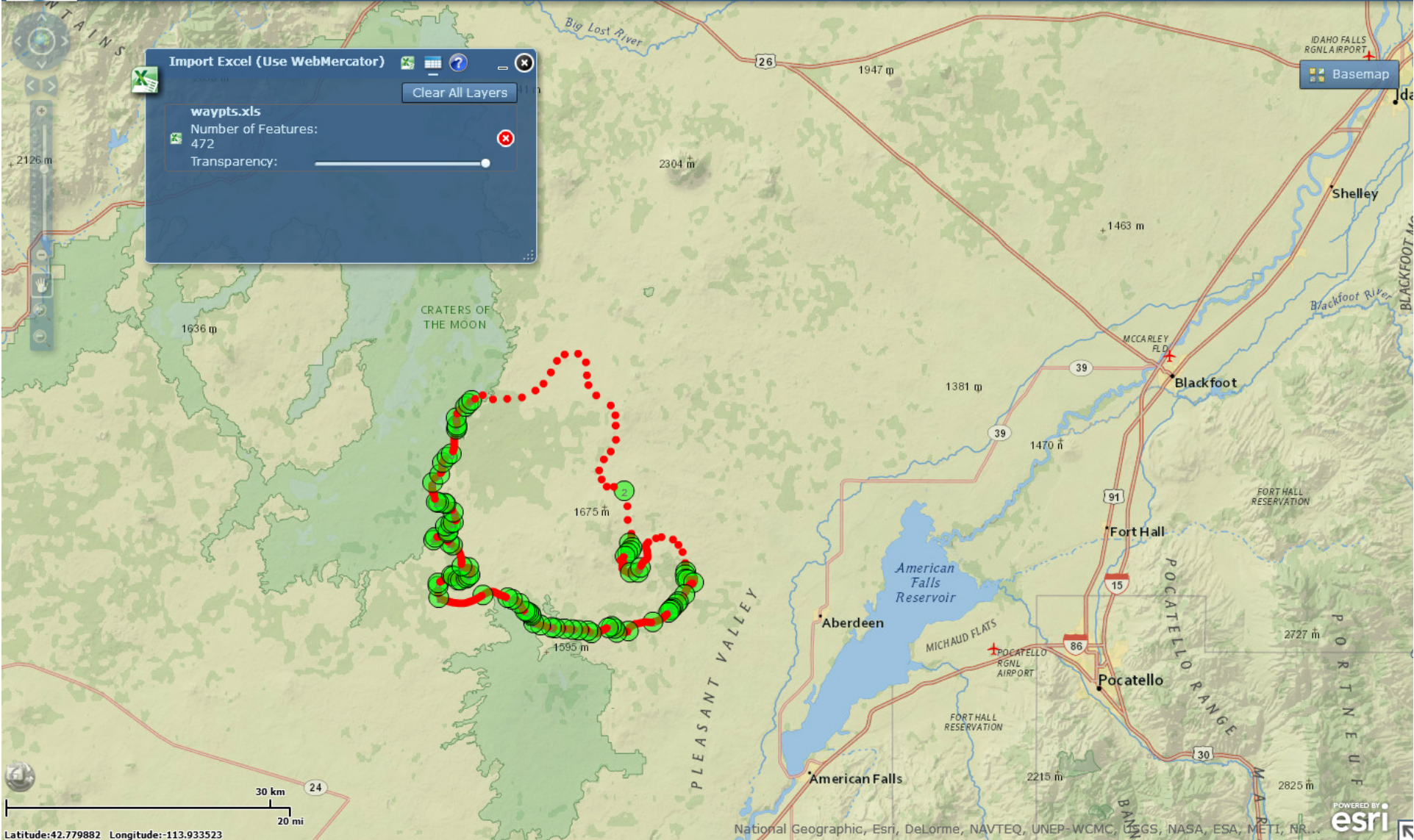
**Import Excel (Use WebMercator)**

waypts.xls

Number of Features: 472

Transparency:

Clear All Layers



Latitude: 42.779882 Longitude: -113.933523





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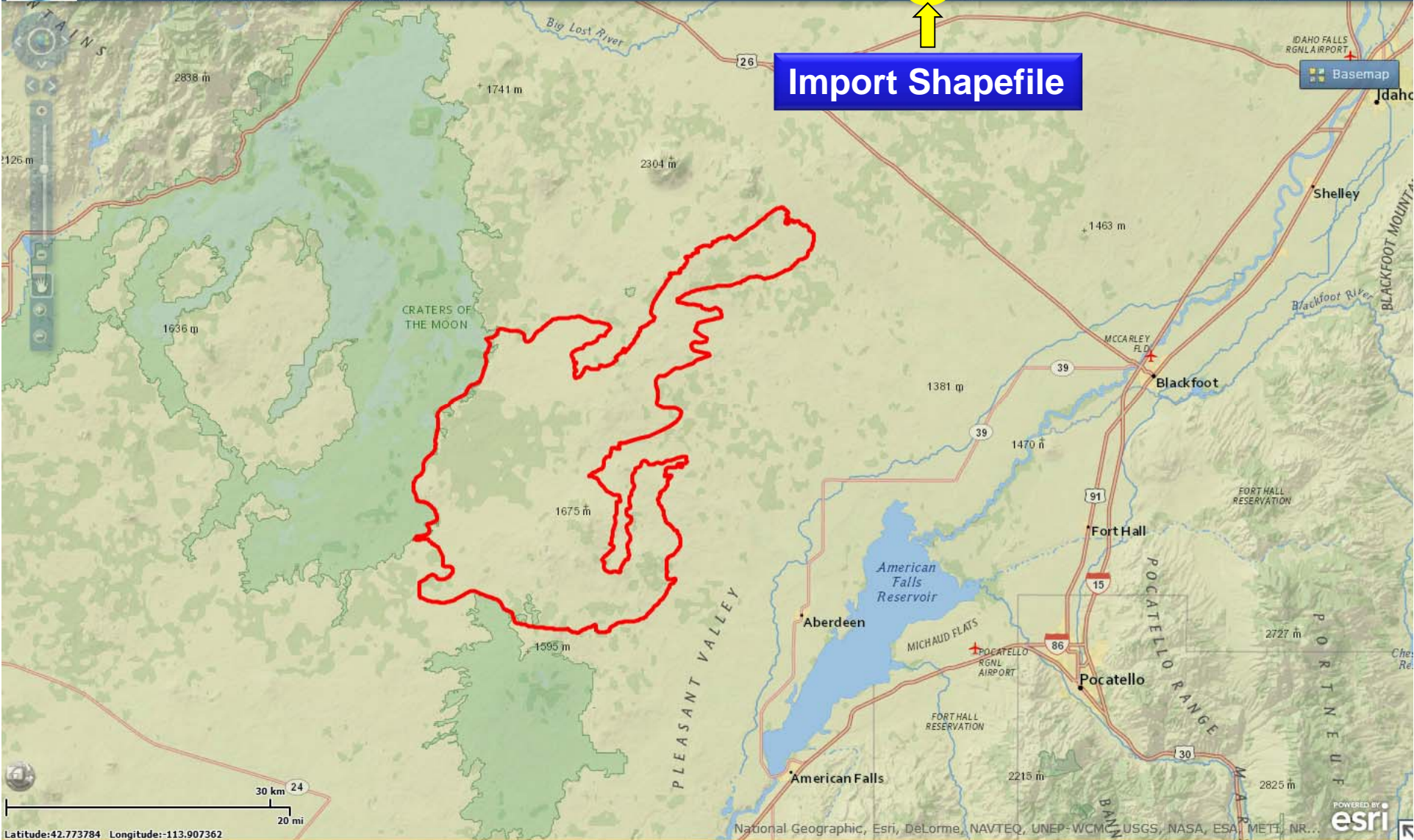
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**Import Shapefile**



Latitude:42.773784 Longitude:-113.907362

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... **POWERED BY esri**



### Import Shapefile

To load a shapefile the files must be zipped.

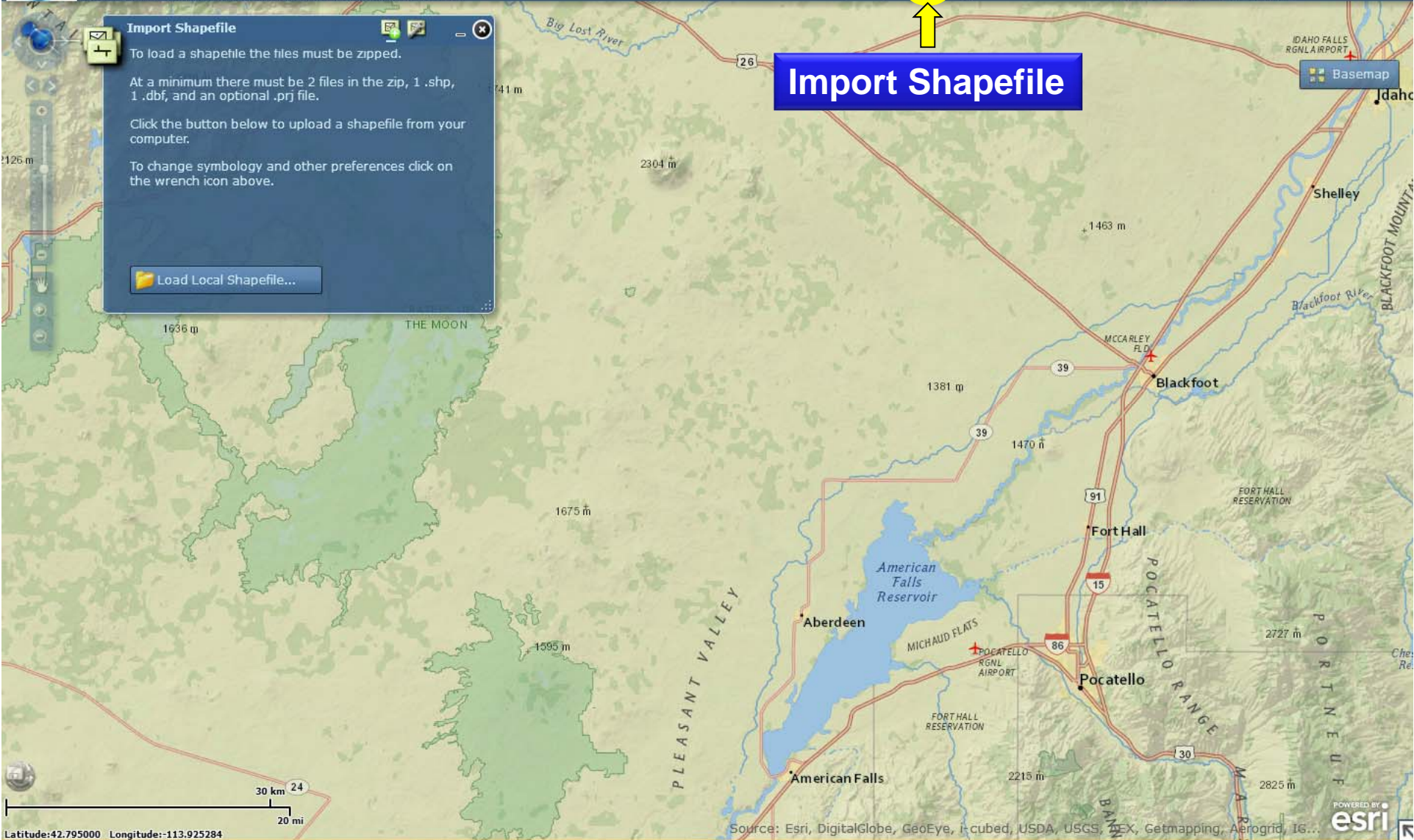
At a minimum there must be 2 files in the zip, 1 .shp, 1 .dbf, and an optional .prj file.

Click the button below to upload a shapefile from your computer.

To change symbology and other preferences click on the wrench icon above.

[Load Local Shapefile...](#)

**Import Shapefile**







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### Import Shapefile

Width 1 Alpha 80%

Line Color ■ Style Solid

Width 2 Alpha 100%

Fill Color ■ Style Backward Diagonal

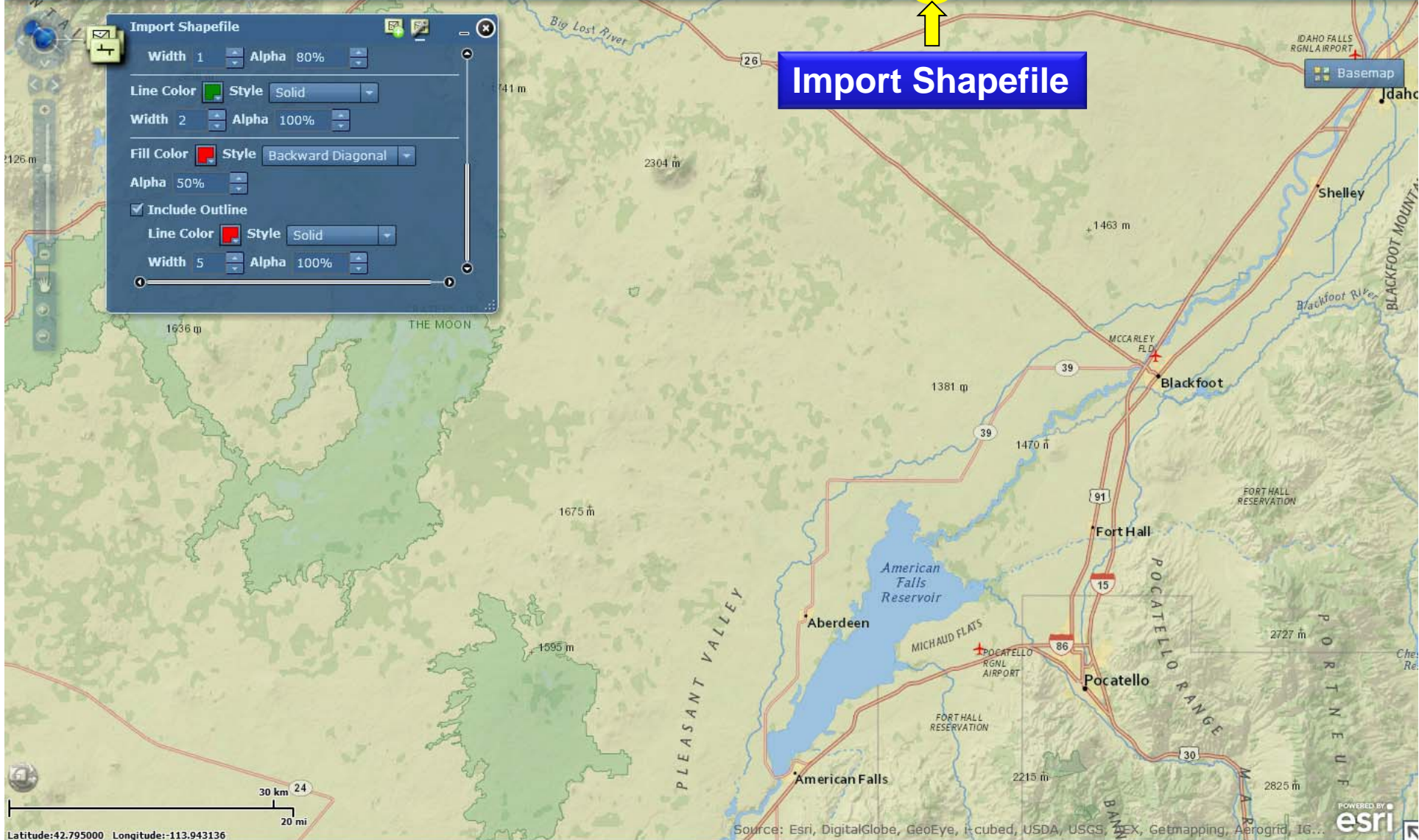
Alpha 50%

Include Outline

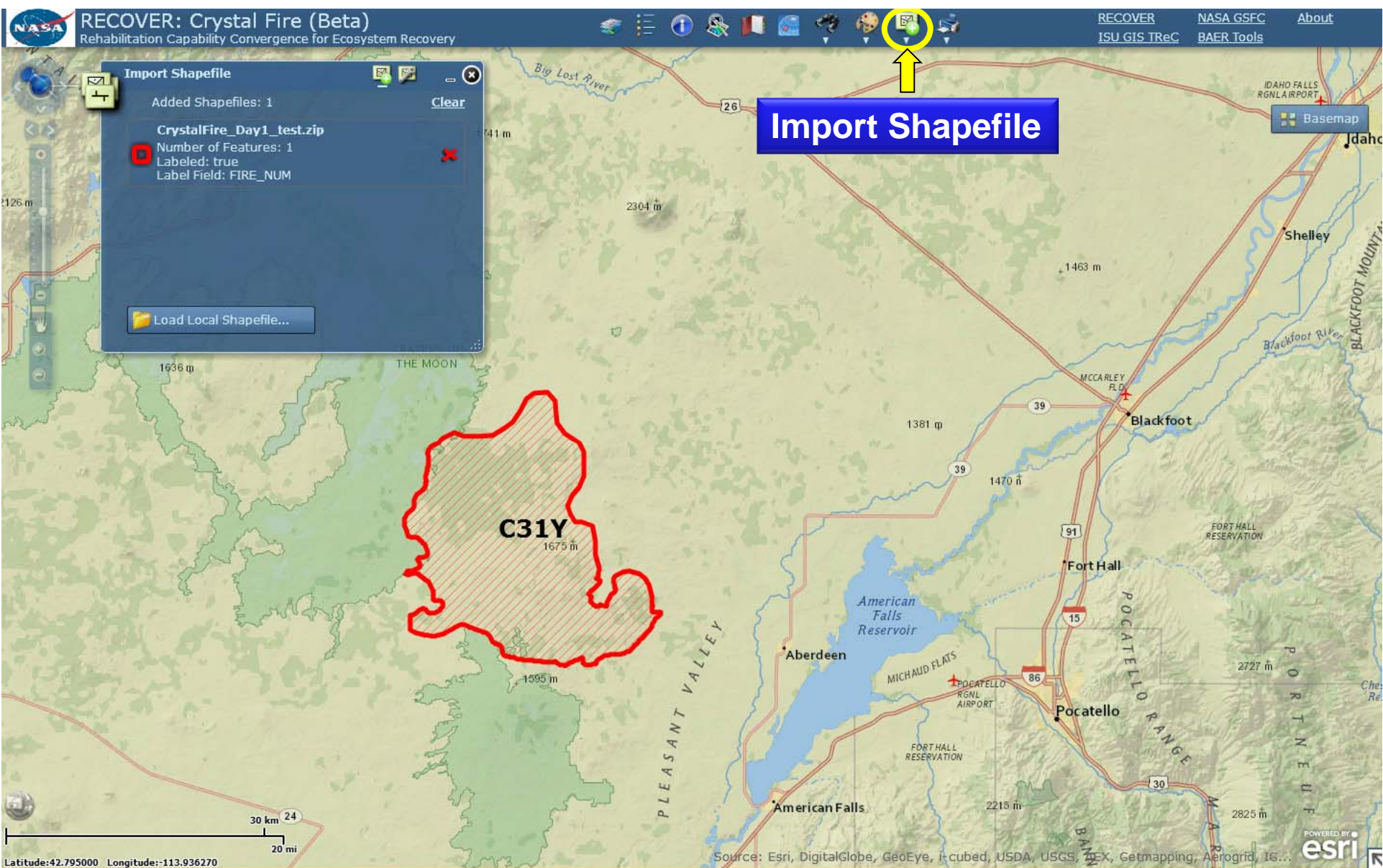
Line Color ■ Style Solid

Width 5 Alpha 100%

**Import Shapefile**











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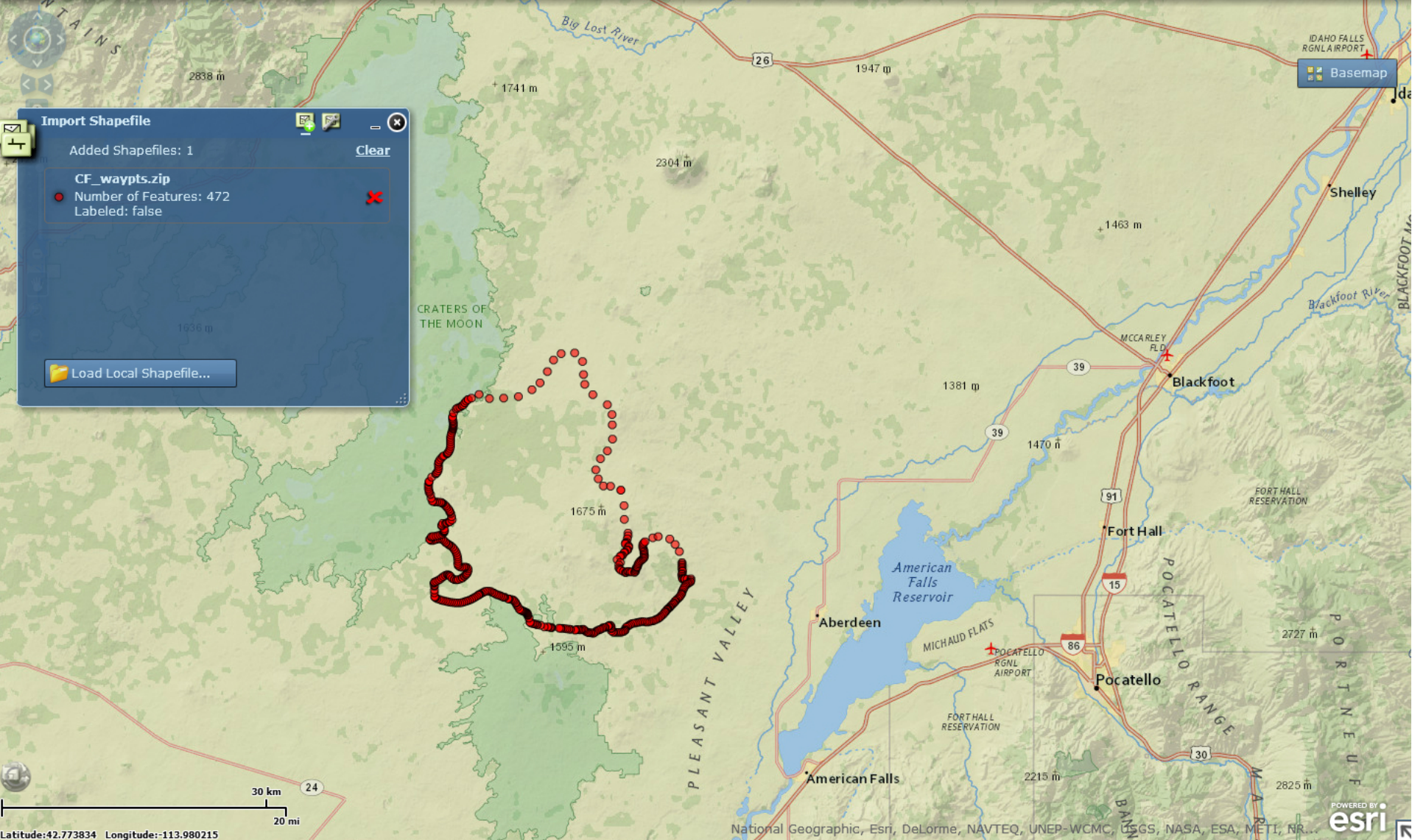
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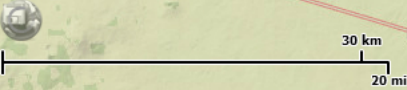
**Import Shapefile**

Added Shapefiles: 1 Clear

**CF\_waypts.zip**

- Number of Features: 472
- Labeled: false

Load Local Shapefile...



Latitude: 42.773834 Longitude: -113.980215





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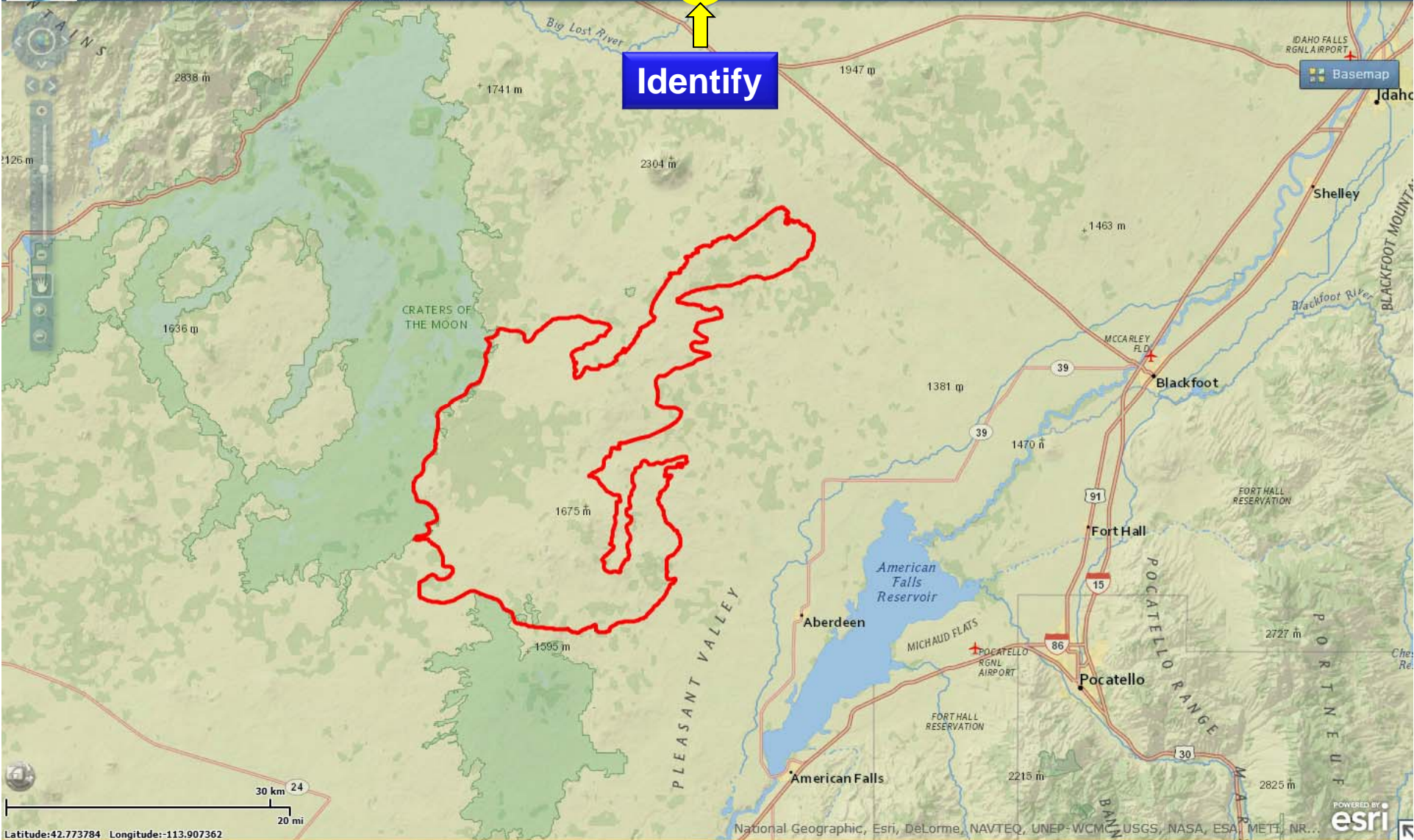
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Identify



Latitude: 42.773784 Longitude: -113.907362







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Identify

**Identify (UC)**

Results Found 1

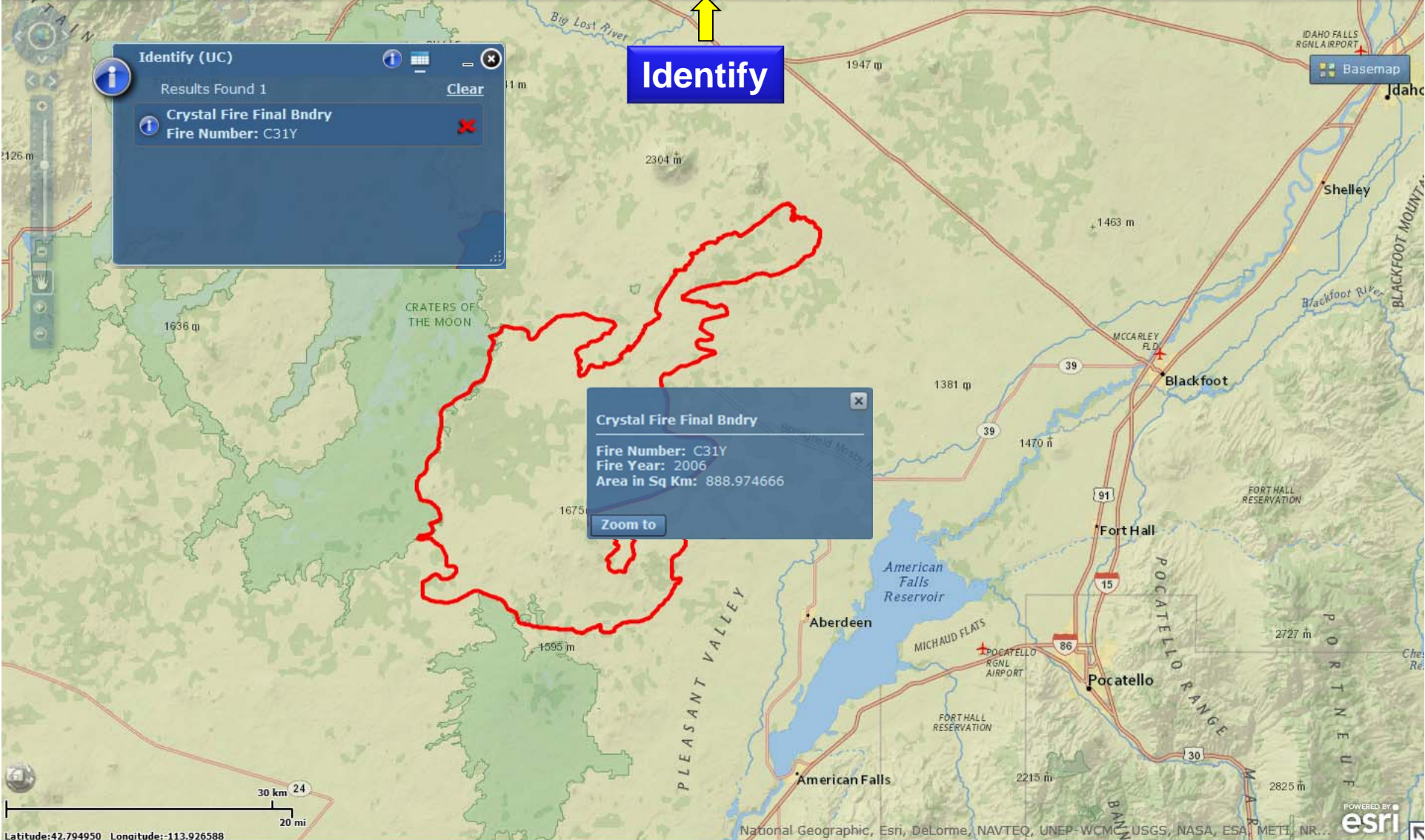
**Crystal Fire Final Bndry**  
Fire Number: C31Y

Clear

**Crystal Fire Final Bndry**

Fire Number: C31Y  
Fire Year: 2006  
Area in Sq Km: 888.974666

Zoom to



Latitude:42.794950 Longitude:-113.926588



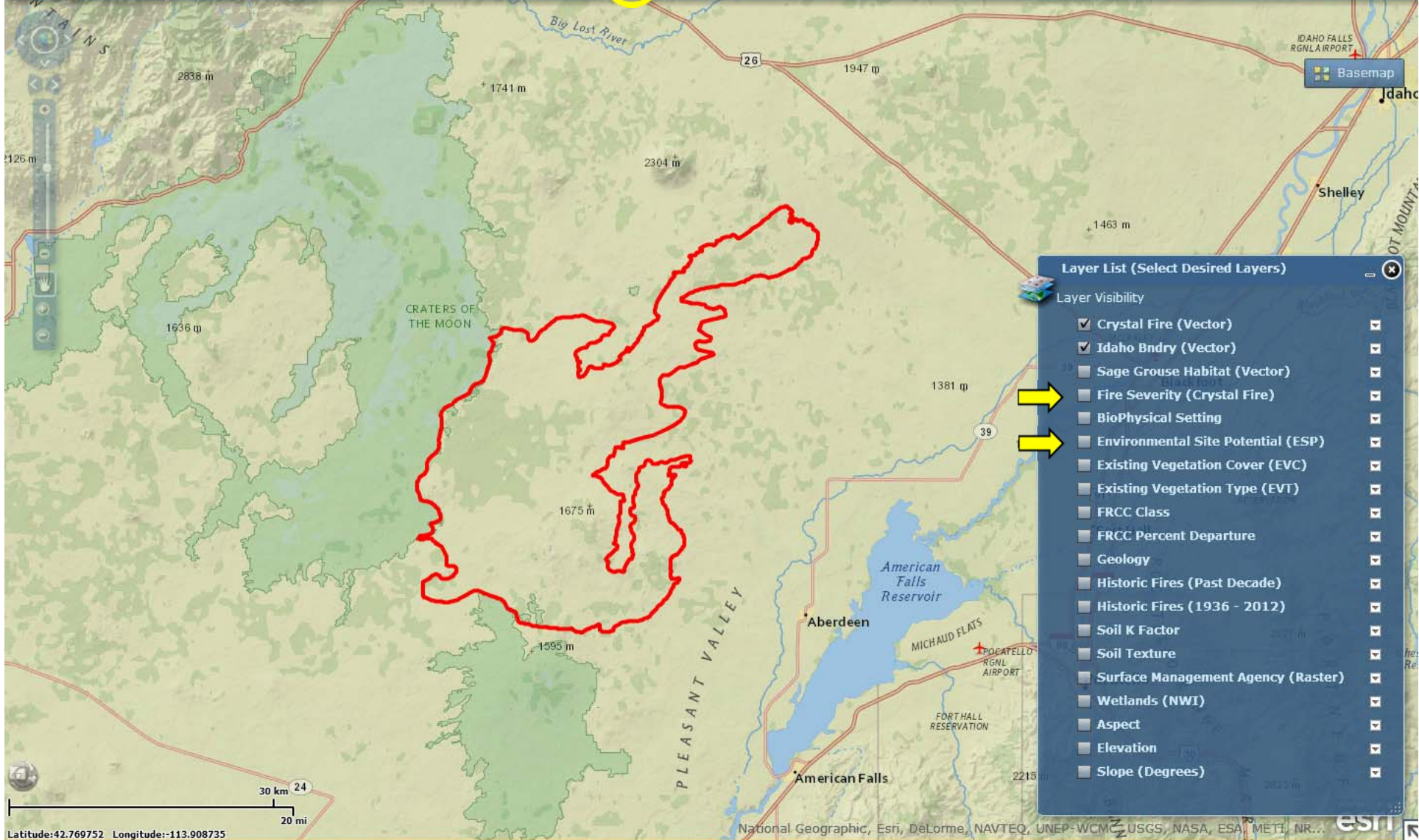




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**Layer List (Select Desired Layers)**

Layer Visibility

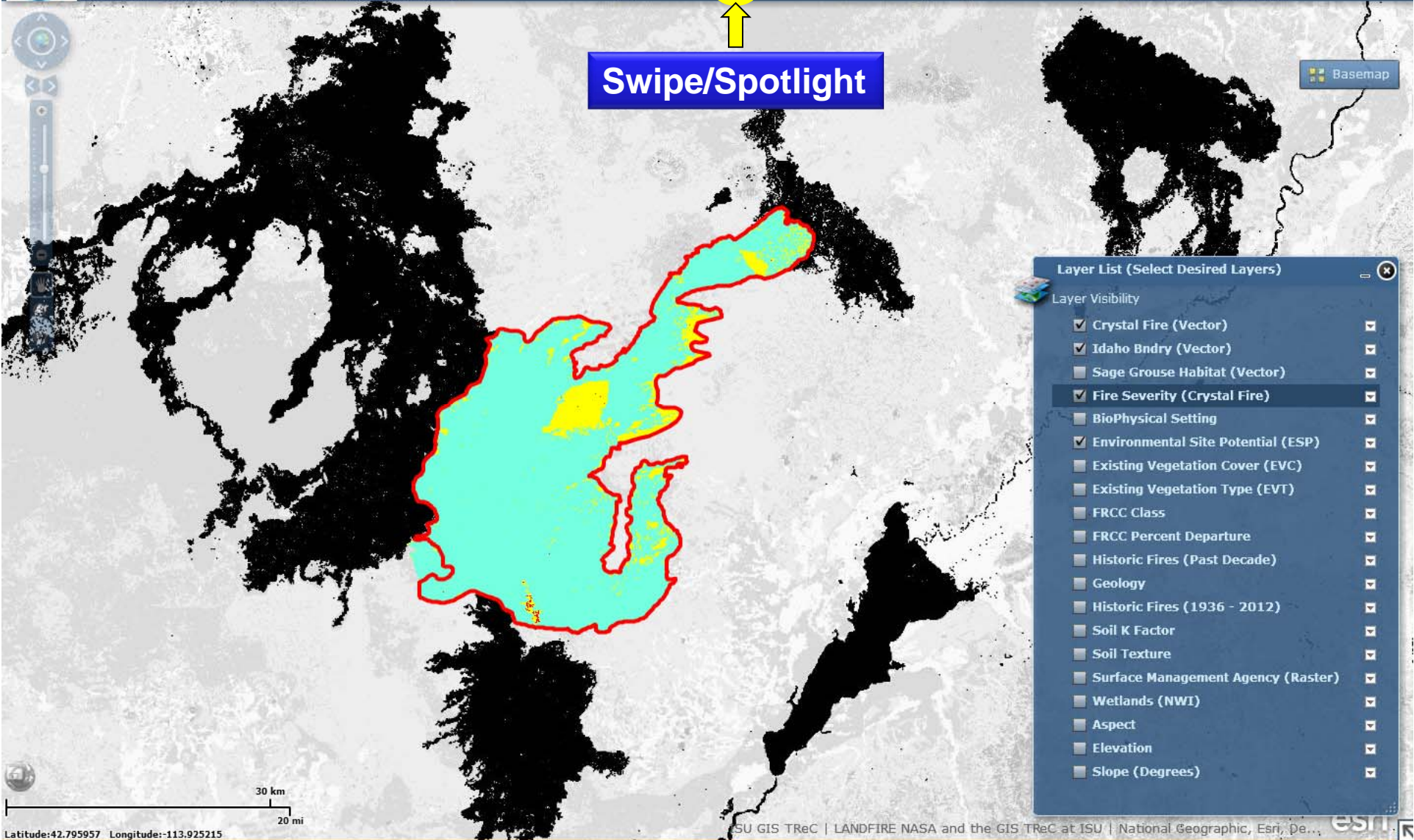
- Crystal Fire (Vector)
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- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)

Latitude:42.769752 Longitude:-113.908735

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... ESRI



Swipe/Spotlight



Layer List (Select Desired Layers)

Layer Visibility

<input checked="" type="checkbox"/>	Crystal Fire (Vector)	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Idaho Bndry (Vector)	<input type="checkbox"/>
<input type="checkbox"/>	Sage Grouse Habitat (Vector)	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Fire Severity (Crystal Fire)	<input type="checkbox"/>
<input type="checkbox"/>	BioPhysical Setting	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Environmental Site Potential (ESP)	<input type="checkbox"/>
<input type="checkbox"/>	Existing Vegetation Cover (EVC)	<input type="checkbox"/>
<input type="checkbox"/>	Existing Vegetation Type (EVT)	<input type="checkbox"/>
<input type="checkbox"/>	FRCC Class	<input type="checkbox"/>
<input type="checkbox"/>	FRCC Percent Departure	<input type="checkbox"/>
<input type="checkbox"/>	Historic Fires (Past Decade)	<input type="checkbox"/>
<input type="checkbox"/>	Geology	<input type="checkbox"/>
<input type="checkbox"/>	Historic Fires (1936 - 2012)	<input type="checkbox"/>
<input type="checkbox"/>	Soil K Factor	<input type="checkbox"/>
<input type="checkbox"/>	Soil Texture	<input type="checkbox"/>
<input type="checkbox"/>	Surface Management Agency (Raster)	<input type="checkbox"/>
<input type="checkbox"/>	Wetlands (NWI)	<input type="checkbox"/>
<input type="checkbox"/>	Aspect	<input type="checkbox"/>
<input type="checkbox"/>	Elevation	<input type="checkbox"/>
<input type="checkbox"/>	Slope (Degrees)	<input type="checkbox"/>





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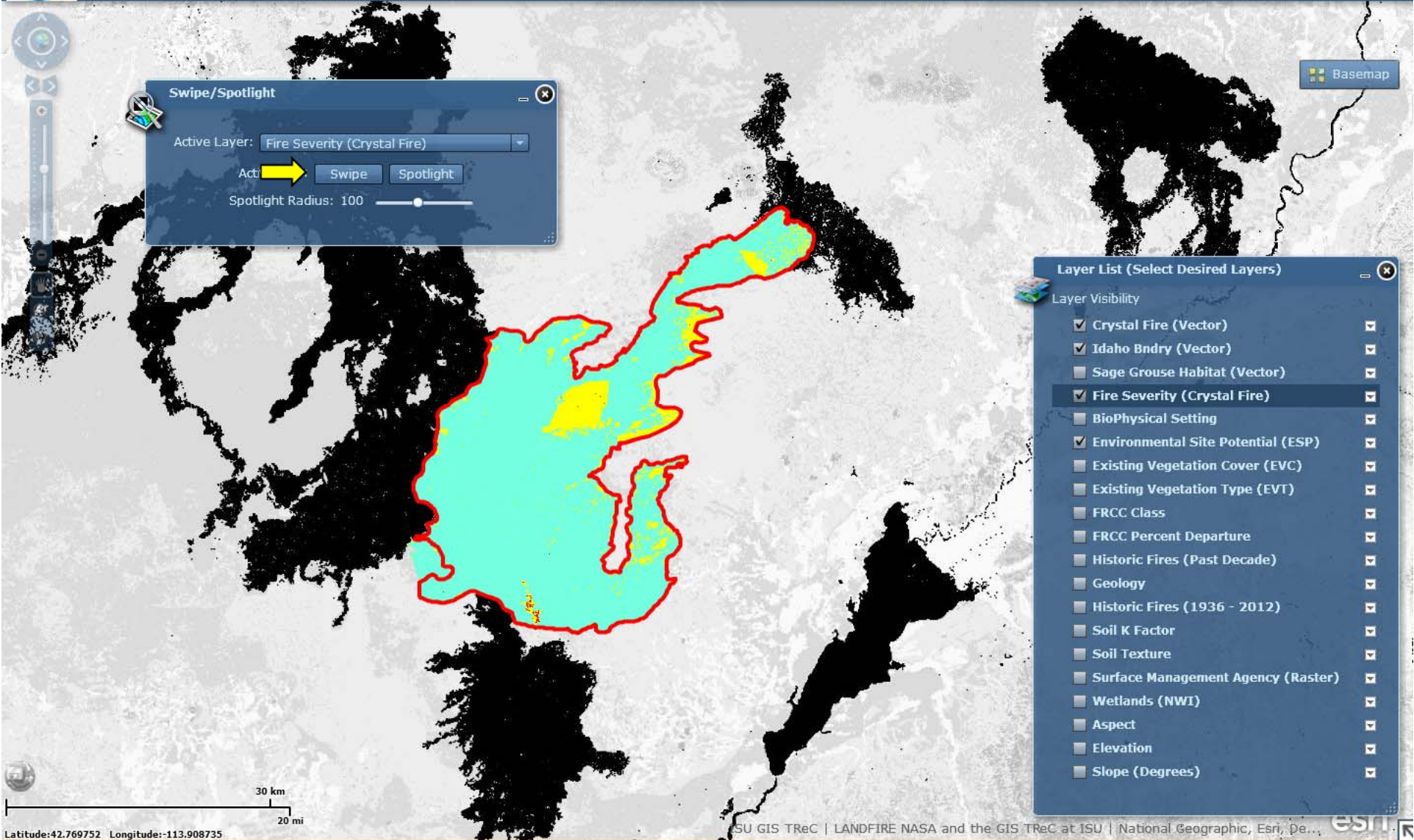
**Swipe/Spotlight**

Active Layer: **Fire Severity (Crystal Fire)**

Act: **Swipe** **Spotlight**

Spotlight Radius: 100

Basemap



**Layer List (Select Desired Layers)**

Layer Visibility

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- Slope (Degrees)

30 km  
20 mi

Latitude:42.769752 Longitude:-113.908735





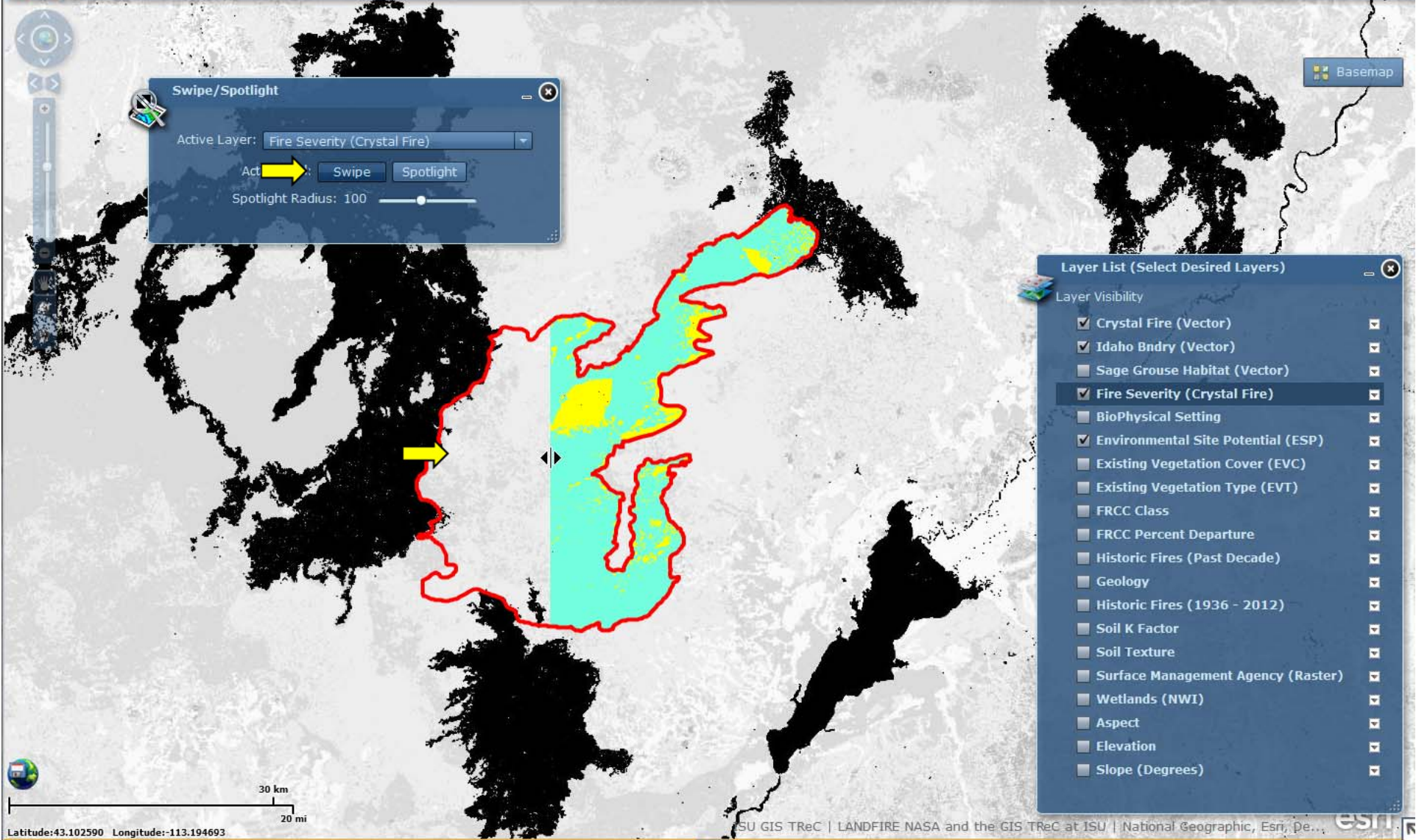
**Swipe/Spotlight**

Active Layer: Fire Severity (Crystal Fire)

Act Swipe Spotlight

Spotlight Radius: 100

Basemap



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30 km  
20 mi

Latitude:43.102590 Longitude:-113.194693





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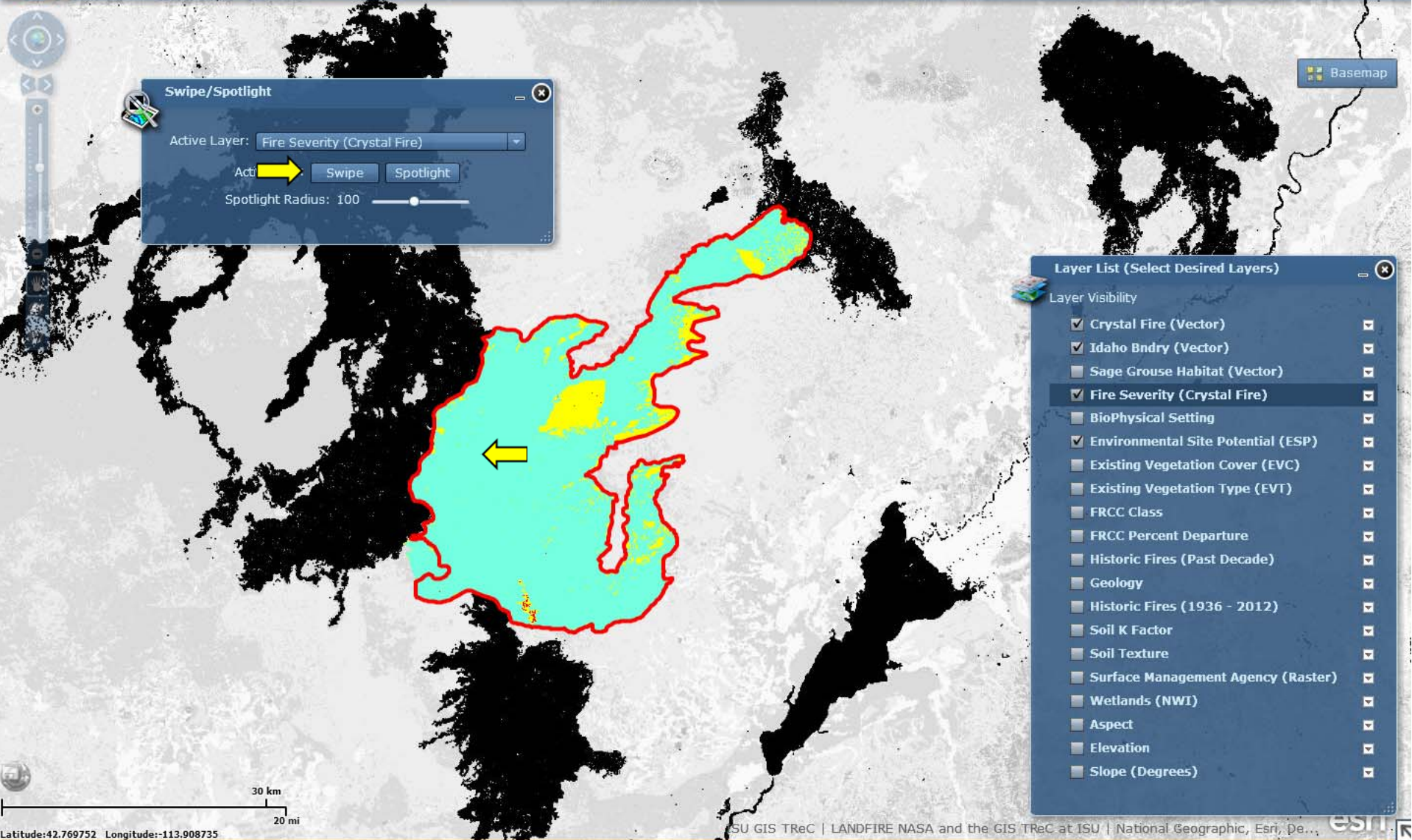
**Swipe/Spotlight**

Active Layer: Fire Severity (Crystal Fire)

Act: Swipe

Spotlight Radius: 100

Basemap



**Layer List (Select Desired Layers)**

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Latitude: 42.769752 Longitude: -113.908735

30 km  
20 mi





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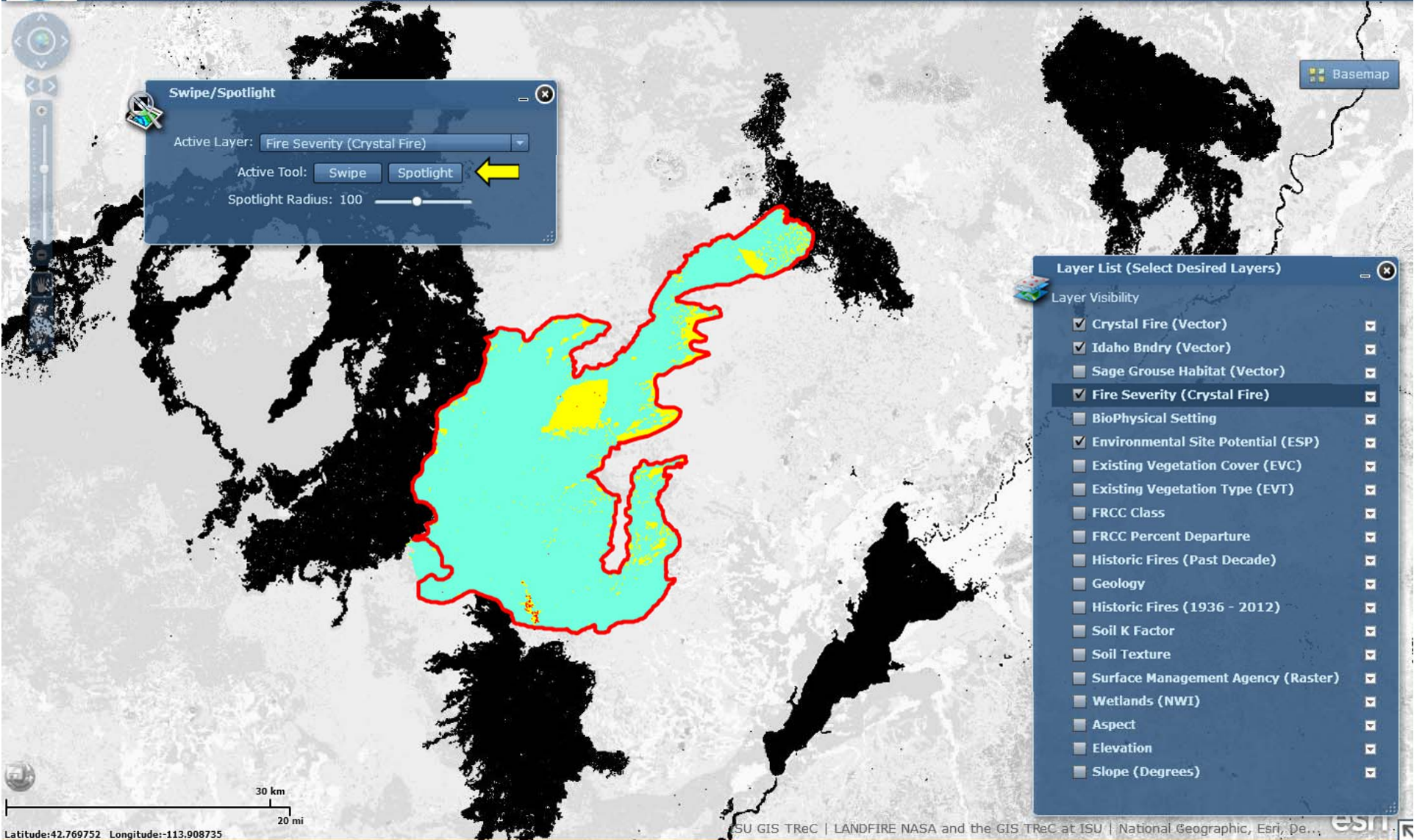
**Swipe/Spotlight**

Active Layer: Fire Severity (Crystal Fire)

Active Tool:

Spotlight Radius: 100

Basemap



**Layer List (Select Desired Layers)**

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Latitude: 42.769752 Longitude: -113.908735



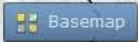


**Swipe/Spotlight**

Active Layer: Fire Severity (Crystal Fire)

Active Tool:   ←

Spotlight Radius: 50



Latitude: 43.139678 Longitude: -113.300436

30 km  
20 mi

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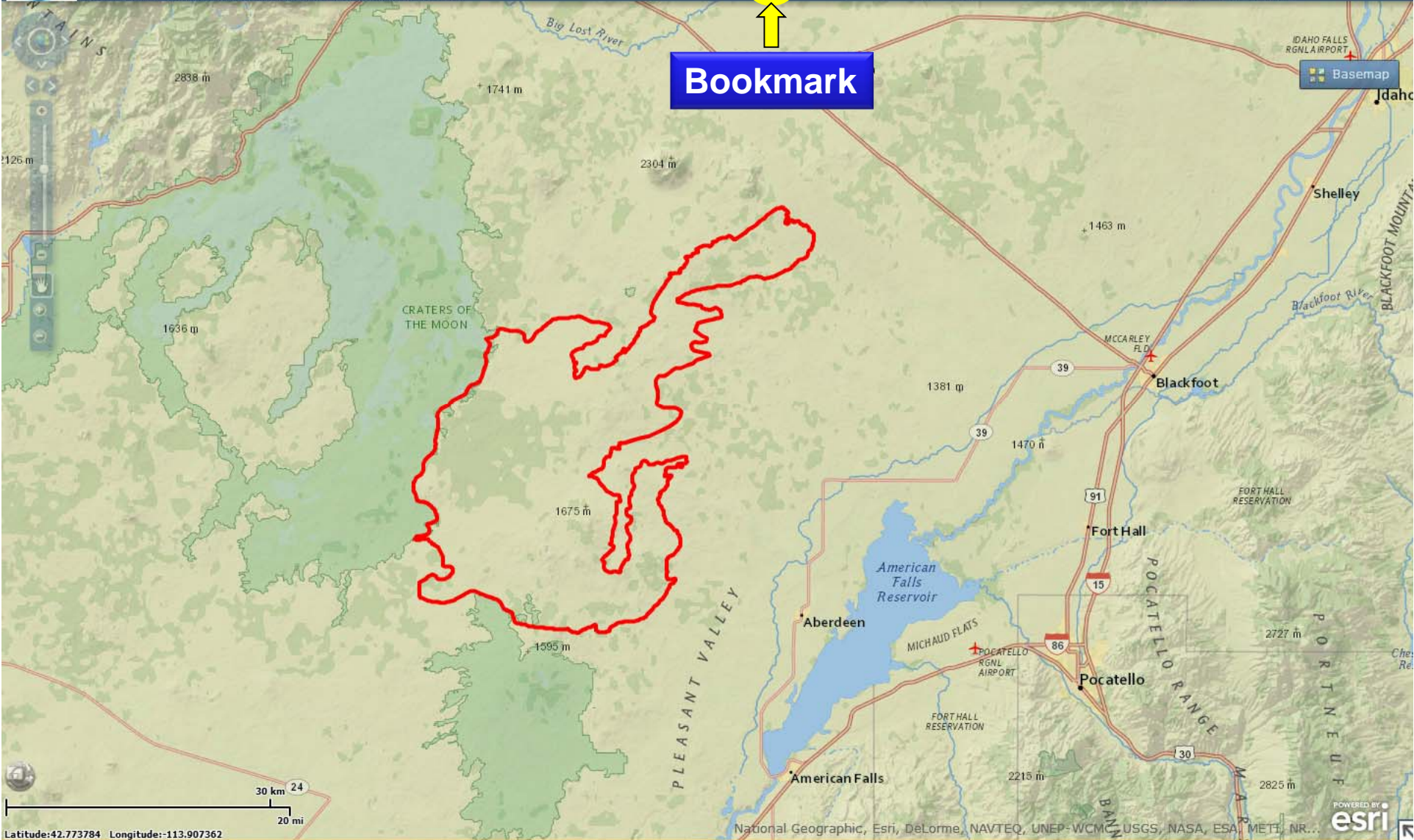
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**Bookmark**



Latitude:42.773784 Longitude:-113.907362







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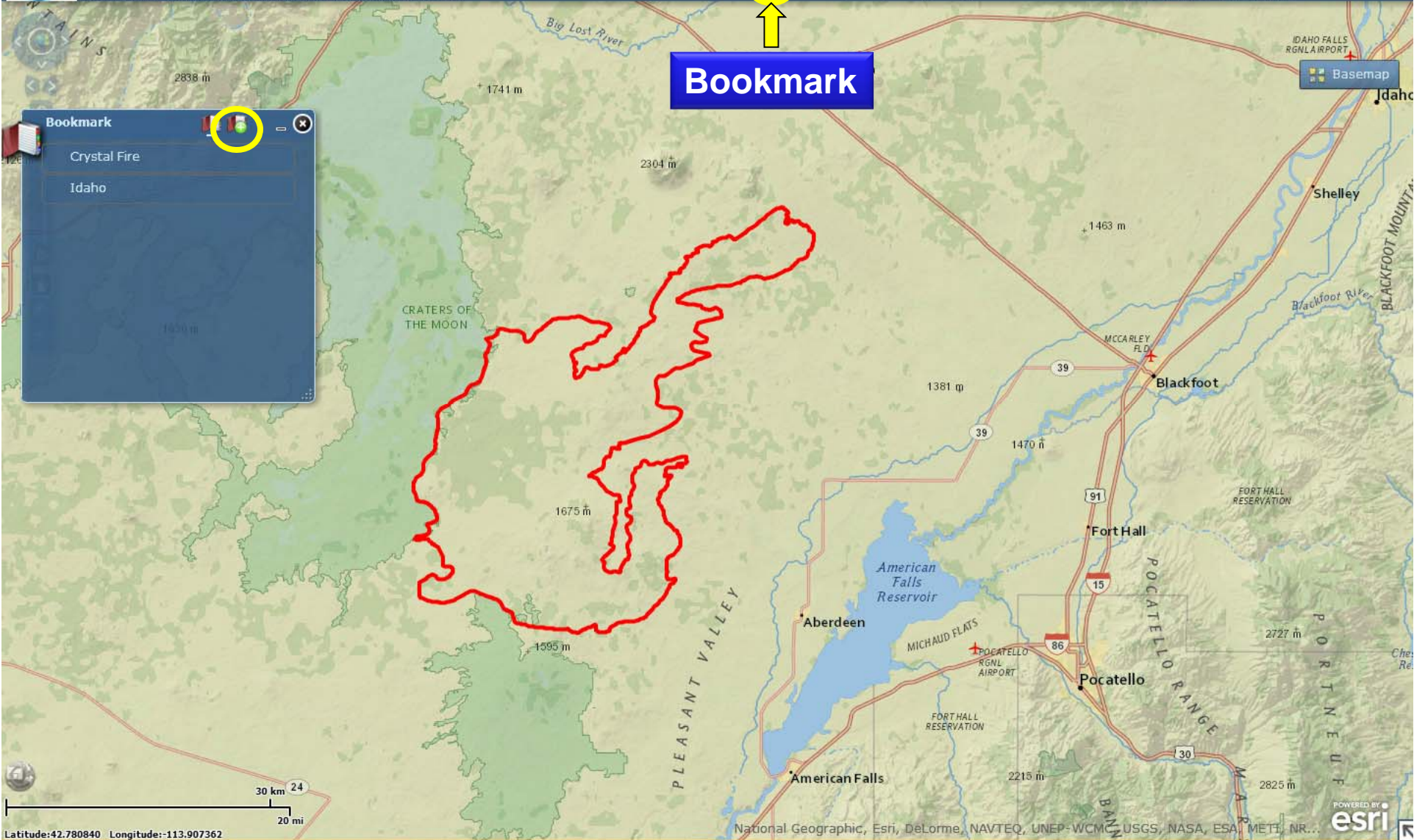
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**Bookmark**

**Bookmark**

- Crystal Fire
- Idaho



Latitude:42.780840 Longitude:-113.907362

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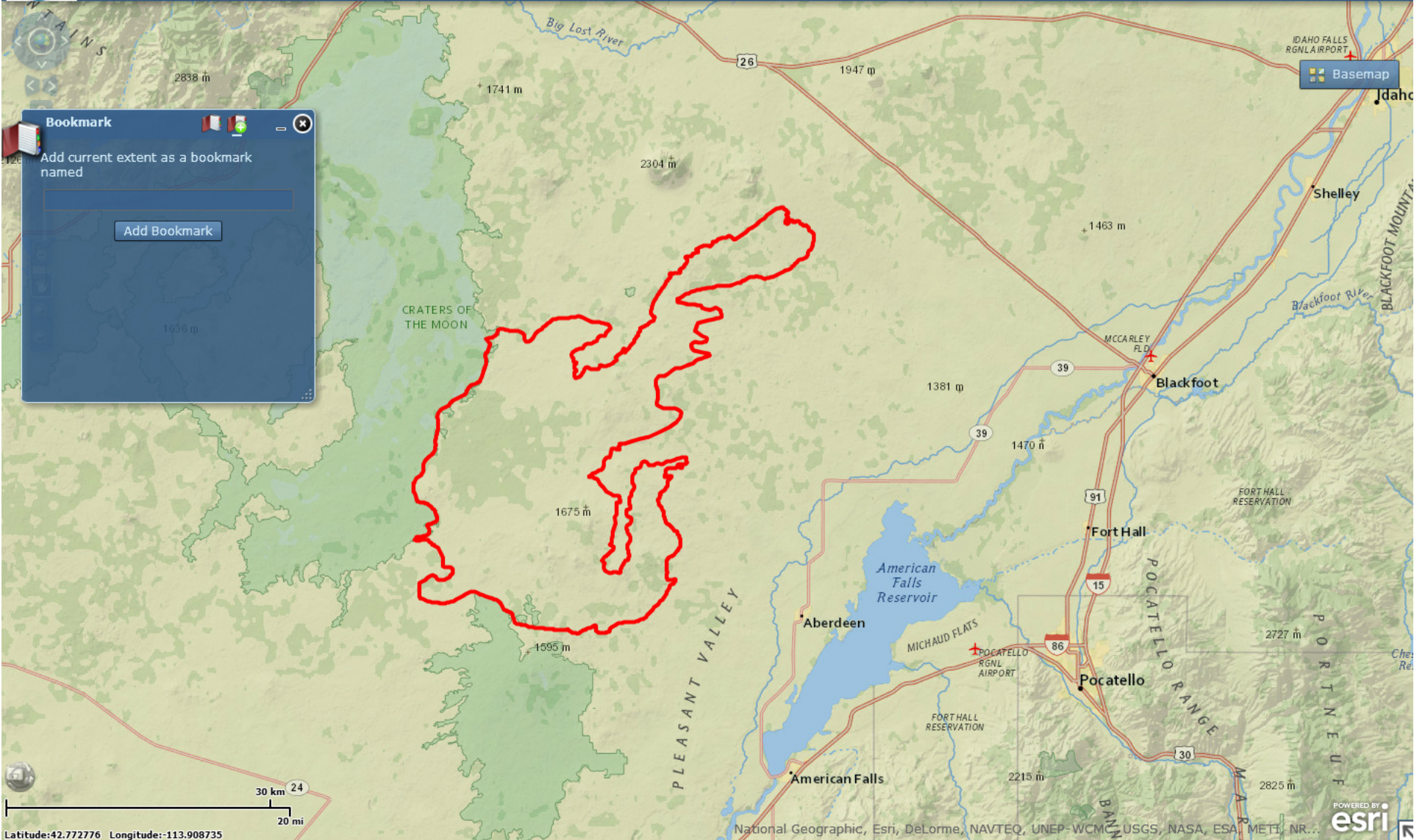
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**Bookmark**

Add current extent as a bookmark named

**Add Bookmark**

30 km 24  
20 mi

Latitude: 42.772776 Longitude: -113.908735





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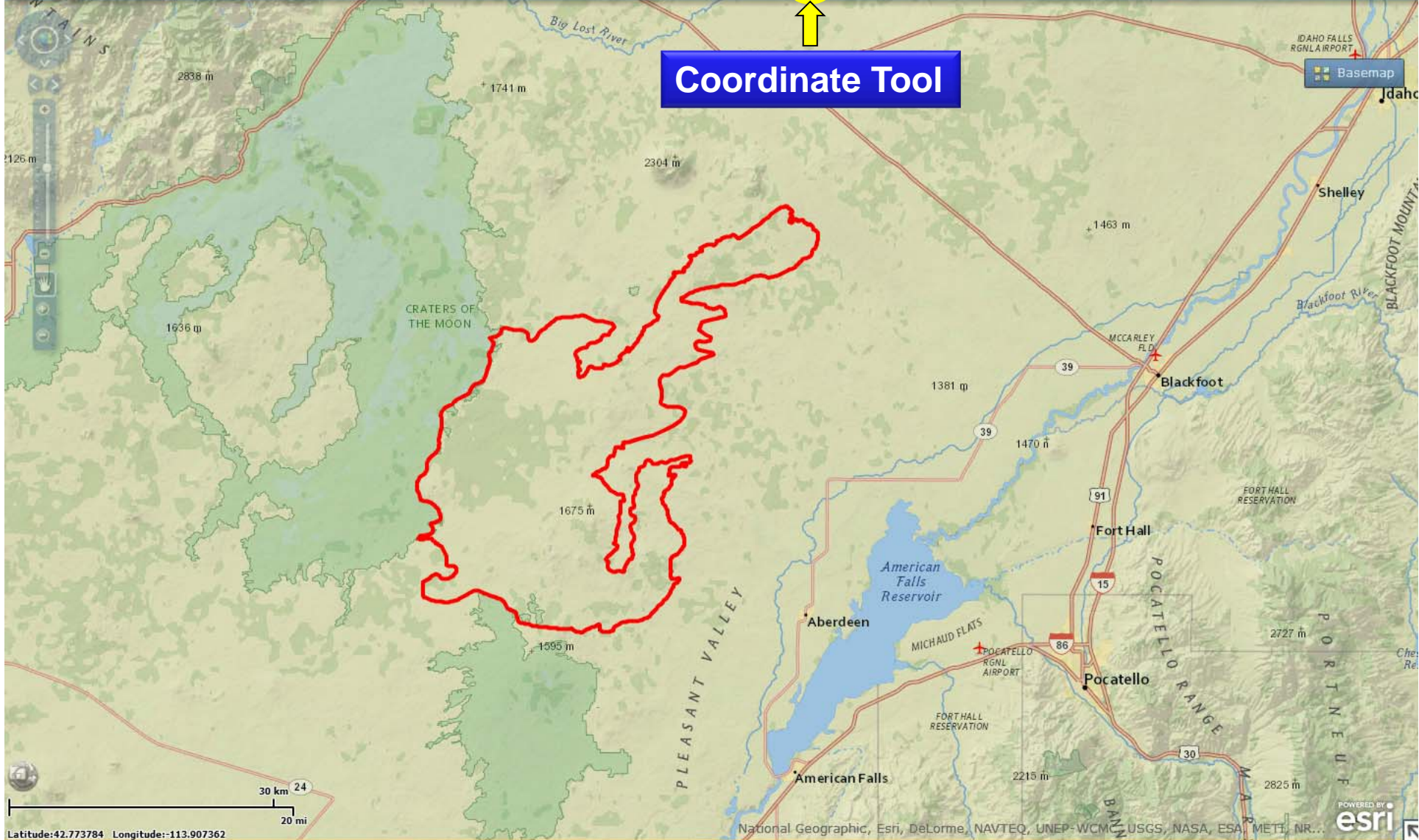
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**Coordinate Tool**



Latitude: 42.773784 Longitude: -113.907362







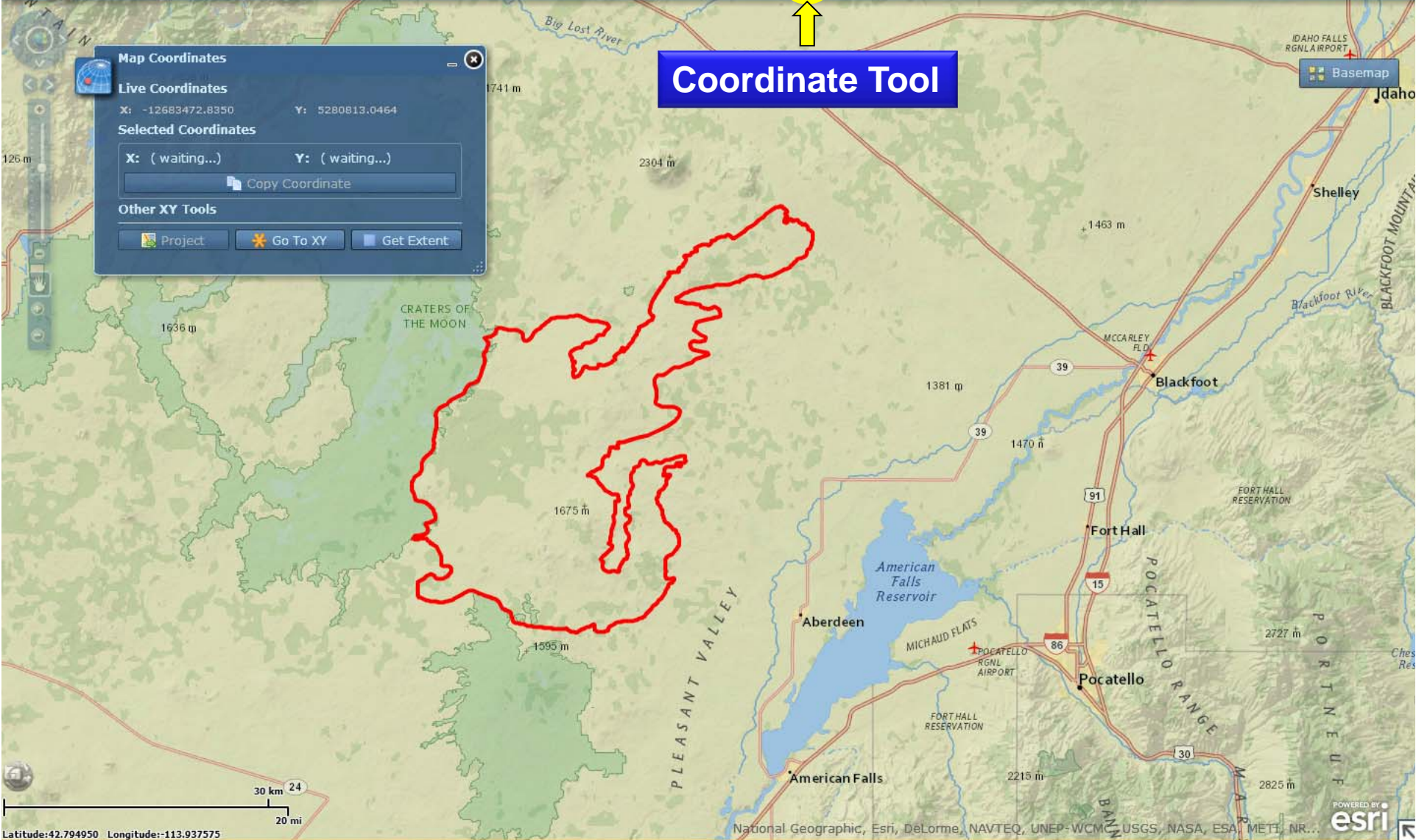
Coordinate Tool

Map Coordinates

Live Coordinates  
X: -12683472.8350 Y: 5280813.0464

Selected Coordinates  
X: ( waiting... ) Y: ( waiting... )  
Copy Coordinate

Other XY Tools  
Project Go To XY Get Extent



Latitude: 42.794950 Longitude: -113.937575







# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



[RECOVER](#)

[NASA GSFC](#)

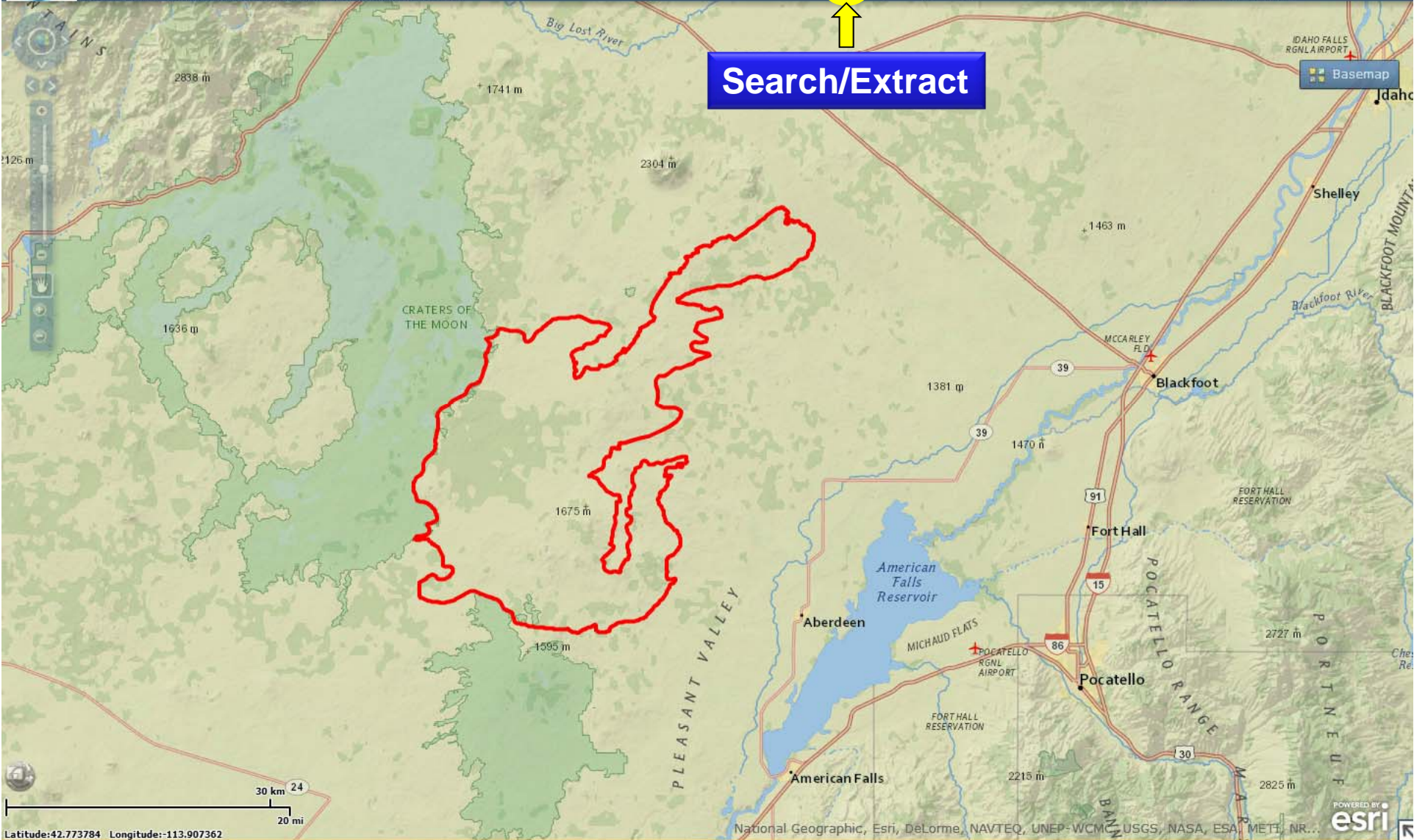
[About](#)

[ISU GIS TRnC](#)

[BAER Tools](#)

Basemap

**Search/Extract**



Latitude:42.773784 Longitude:-113.907362







# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



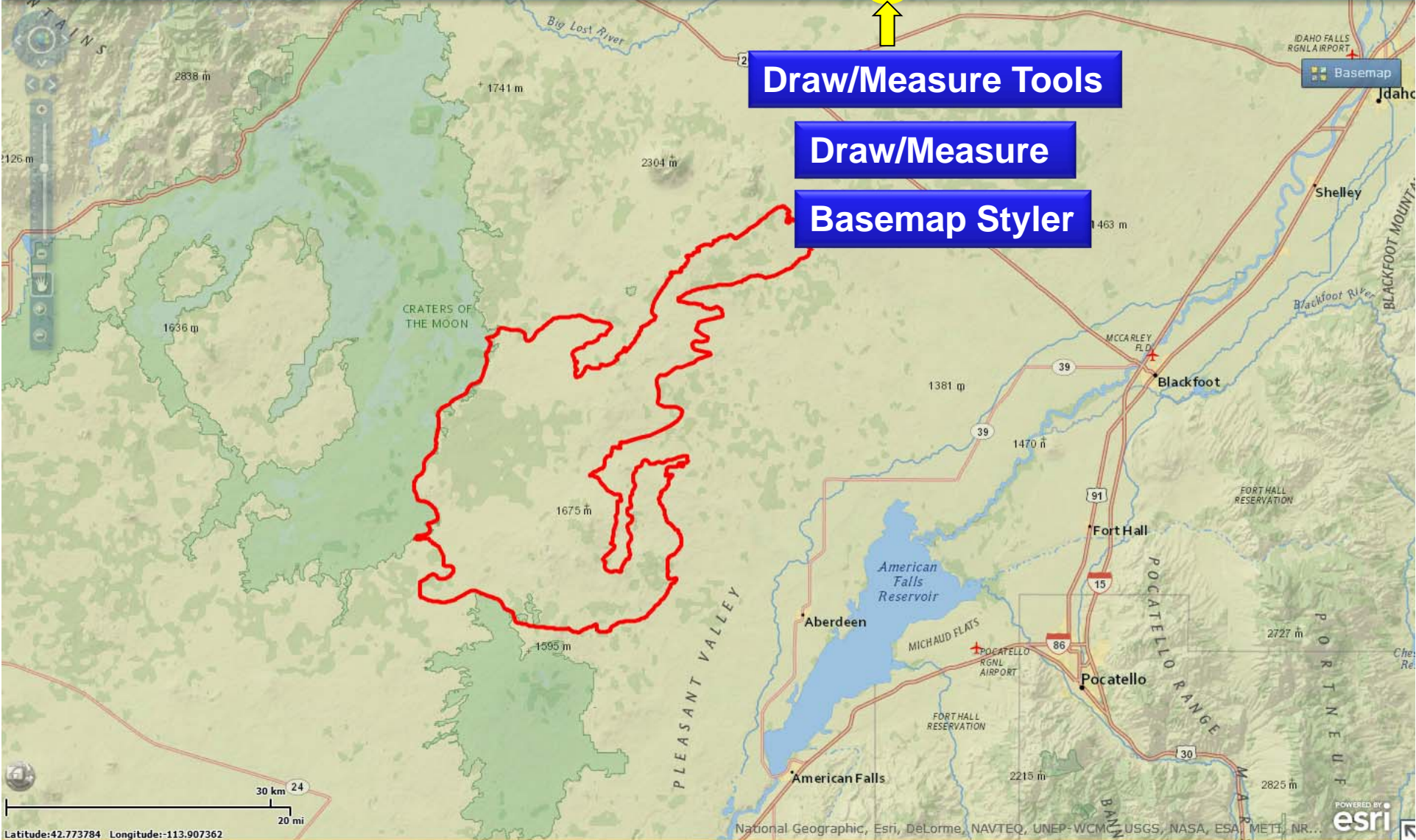
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[NASA GSFC](#)

[About](#)

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[BAER Tools](#)



**Draw/Measure Tools**

**Draw/Measure**

**Basemap Styler**

Latitude:42.773784 Longitude:-113.907362







# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery

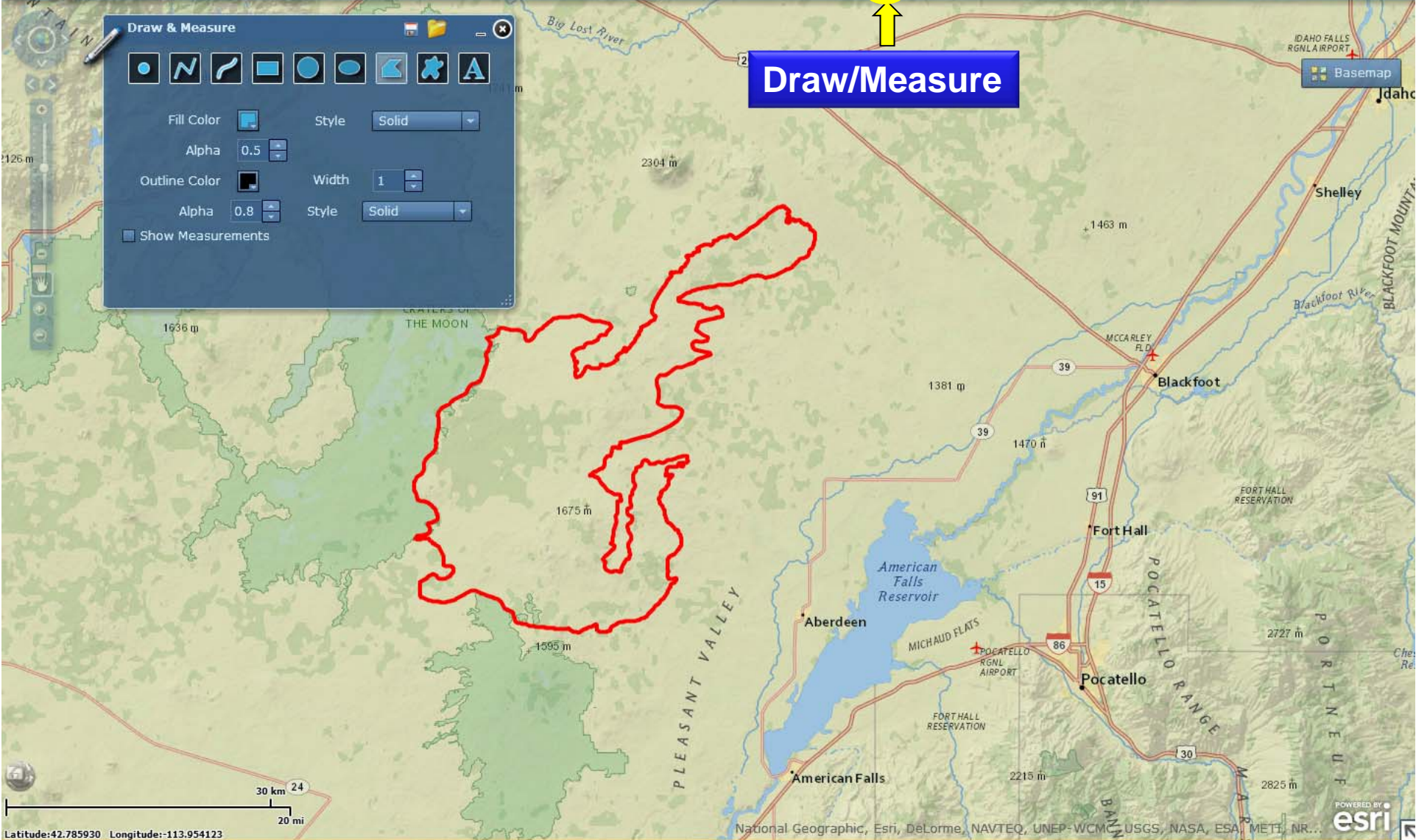


RECOVER NASA GSFC About  
ISU GIS TRc BAER Tools

### Draw & Measure

Fill Color: [Blue] Style: Solid  
Alpha: 0.5  
Outline Color: [Black] Width: 1  
Alpha: 0.8 Style: Solid  
 Show Measurements

**Draw/Measure**



Latitude:42.785930 Longitude:-113.954123

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... **esri**





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



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[BAER Tools](#)

### BaseMap Styler

Select Basemap Style:

- Default
- Gray Scale
- Desaturated
- Blank

**Basemap Styler**



Latitude: 42.795957 Longitude: -113.921095

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... **esri**





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery

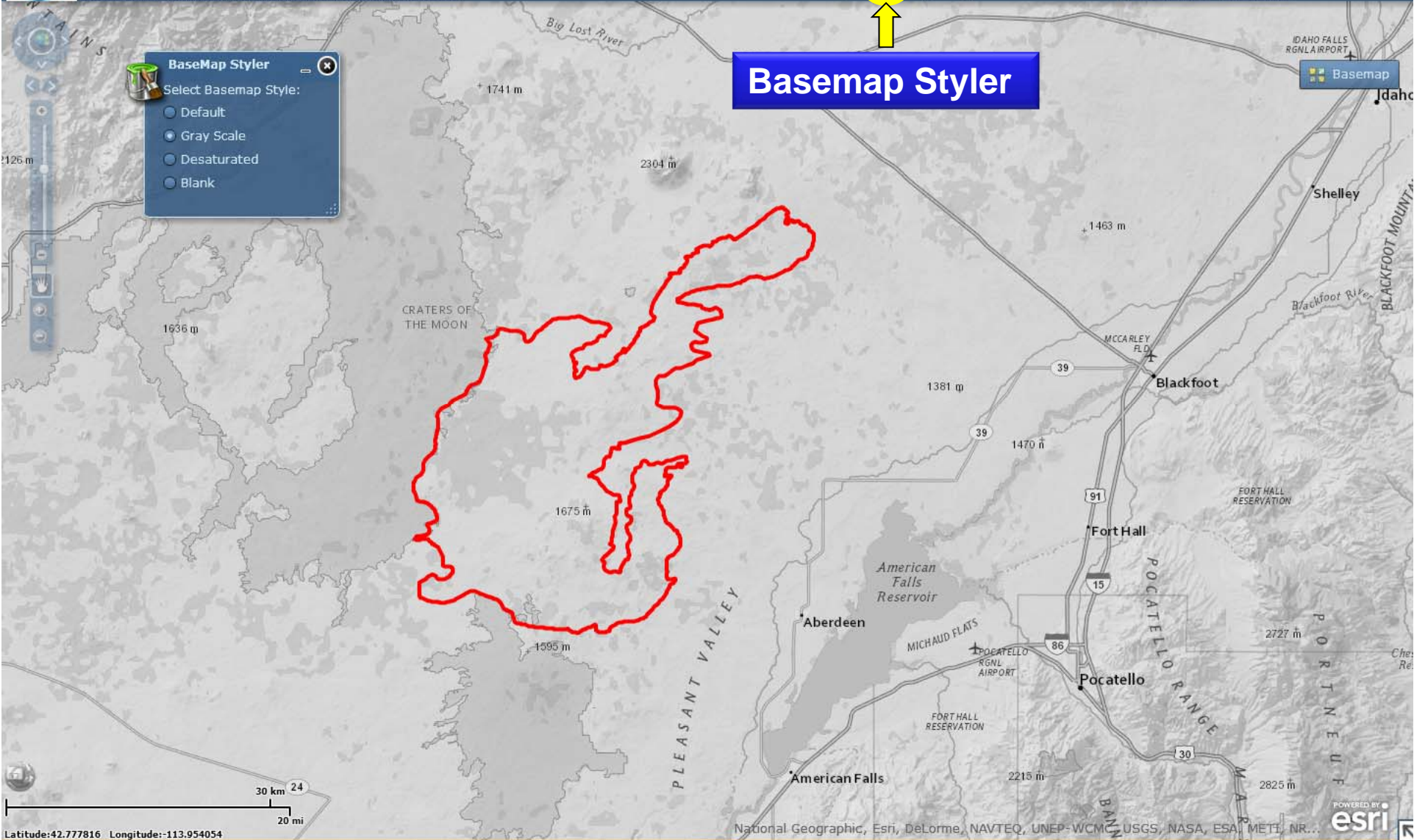


### BaseMap Styler

Select Basemap Style:

- Default
- Gray Scale
- Desaturated
- Blank

**Basemap Styler**



Latitude:42.777816 Longitude:-113.954054





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



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[NASA GSFC](#)

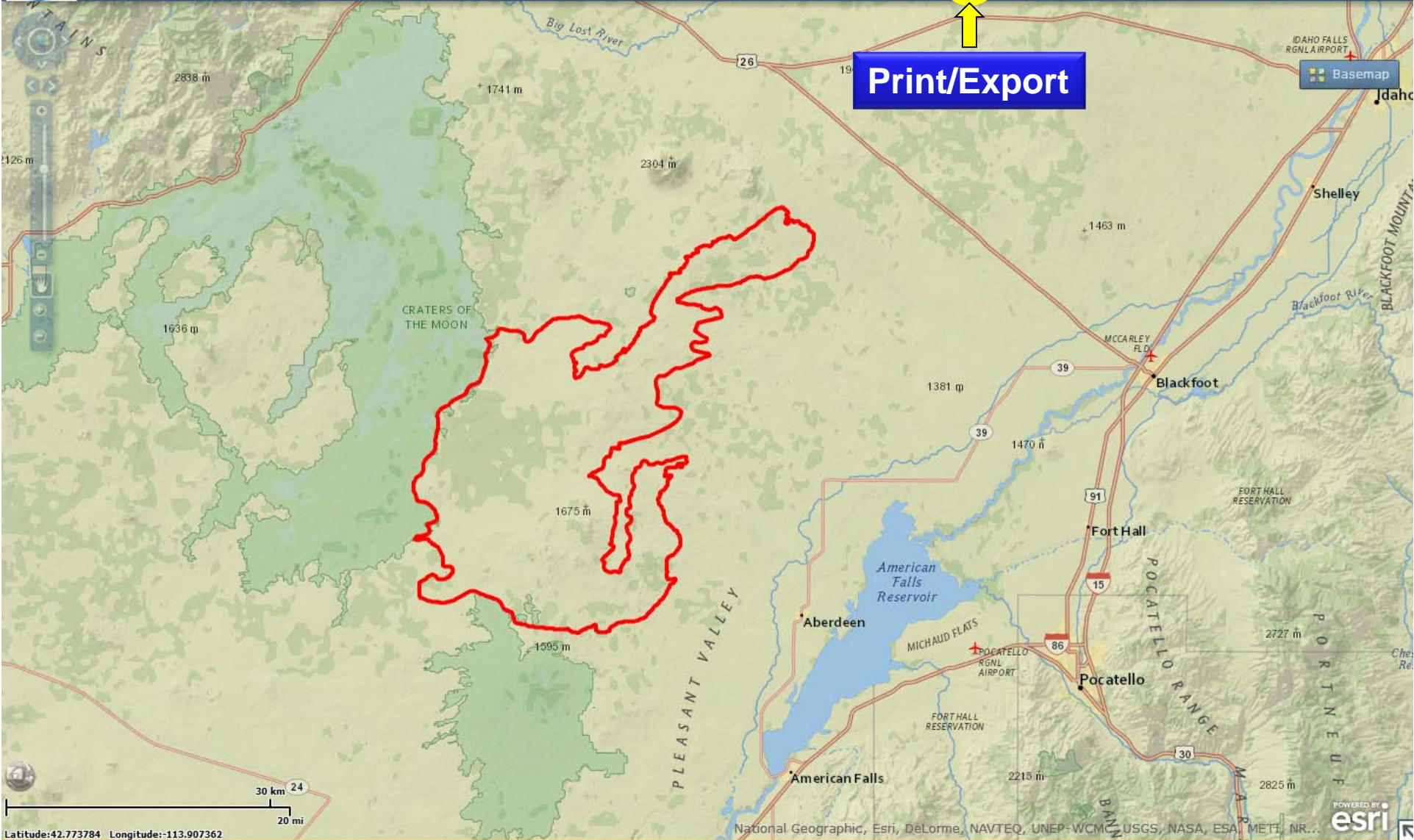
[About](#)

[ISU GIS TRnC](#)

[BAER Tools](#)

[Basemap](#)

**Print/Export**



Latitude:42.773784 Longitude:-113.907362

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NR... **POWERED BY esri**





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



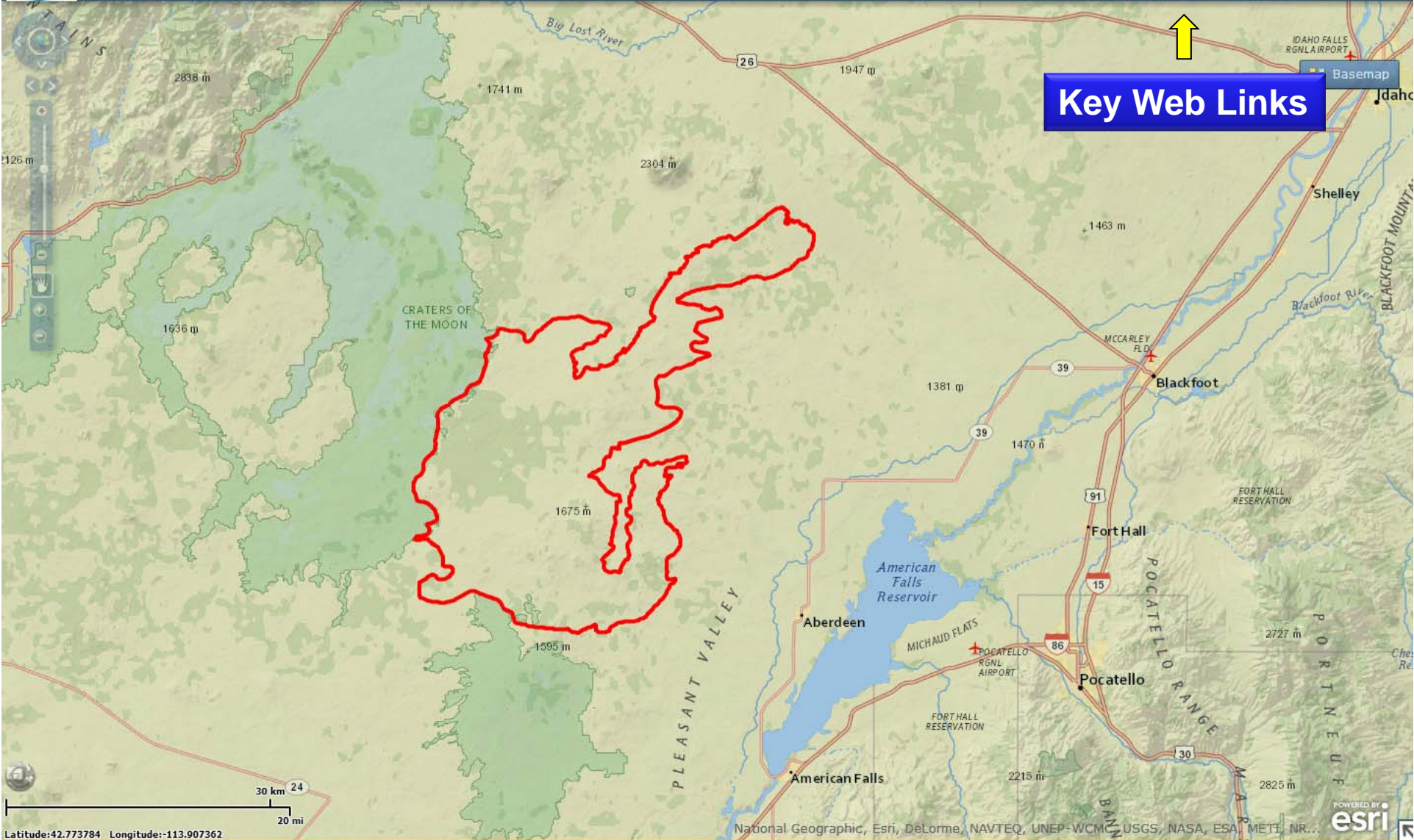
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[NASA GSFC](#)

[About](#)

[ISU GIS TRC](#)

[BAER Tools](#)



**Key Web Links**



Latitude: 42.773784 Longitude: -113.907362







# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery

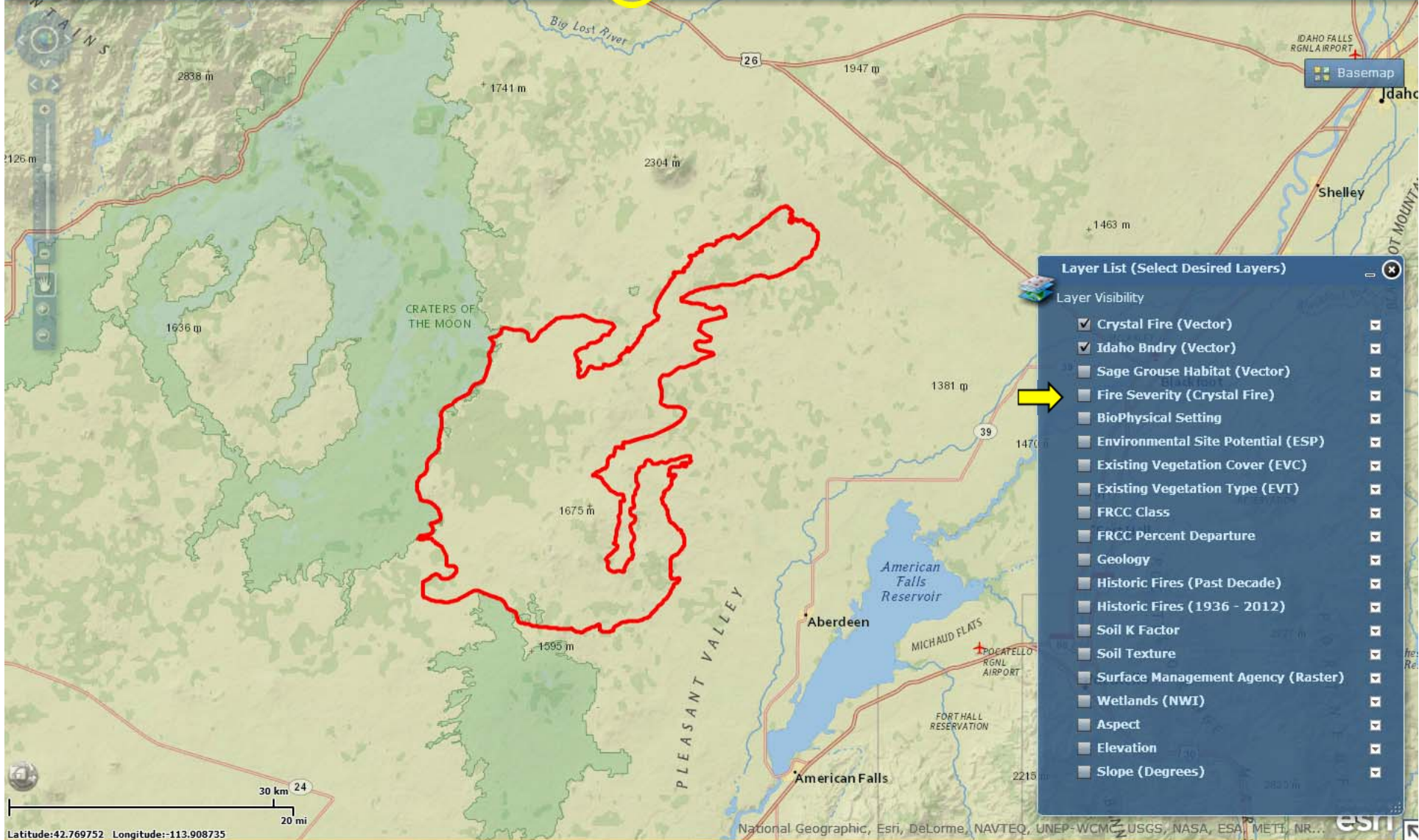
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[NASA GSFC](#)

[About](#)

[ISU GIS TRac](#)

[BAER Tools](#)



**Layer List (Select Desired Layers)**

Layer Visibility

- Crystal Fire (Vector)
- Idaho Bndry (Vector)
- Sage Grouse Habitat (Vector)
- Fire Severity (Crystal Fire)
- BioPhysical Setting
- Environmental Site Potential (ESP)
- Existing Vegetation Cover (EVC)
- Existing Vegetation Type (EVT)
- FRCC Class
- FRCC Percent Departure
- Geology
- Historic Fires (Past Decade)
- Historic Fires (1936 - 2012)
- Soil K Factor
- Soil Texture
- Surface Management Agency (Raster)
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)

Latitude:42.769752 Longitude:-113.908735





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



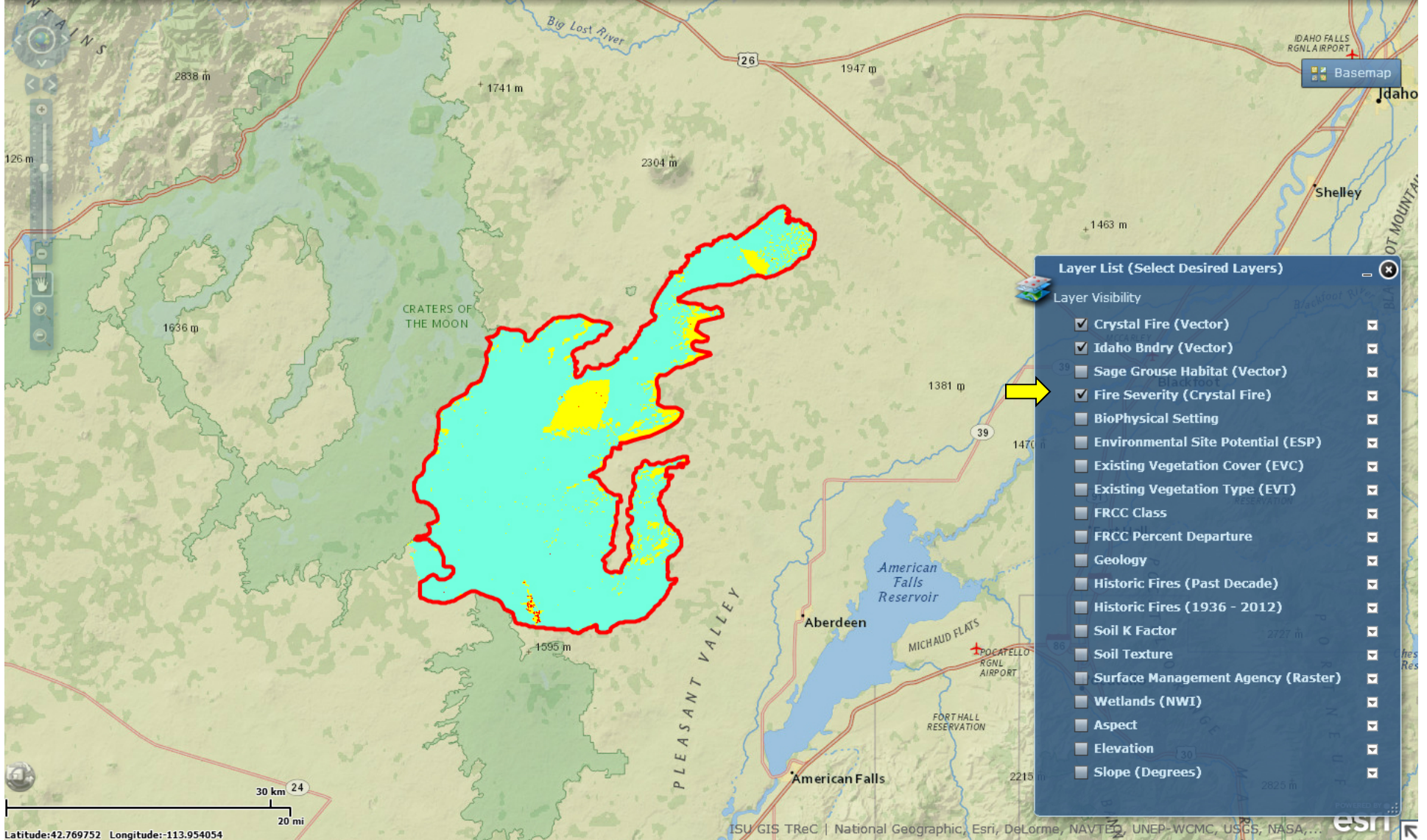
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[NASA GSFC](#)

[About](#)

[ISU GIS TRcC](#)

[BAER Tools](#)



### Layer List (Select Desired Layers)

Layer Visibility

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- Idaho Bndry (Vector)
- Sage Grouse Habitat (Vector)
- Fire Severity (Crystal Fire)
- BioPhysical Setting
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- Existing Vegetation Cover (EVC)
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- Geology
- Historic Fires (Past Decade)
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- Soil K Factor
- Soil Texture
- Surface Management Agency (Raster)
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)

Latitude:42.769752 Longitude:-113.954054





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



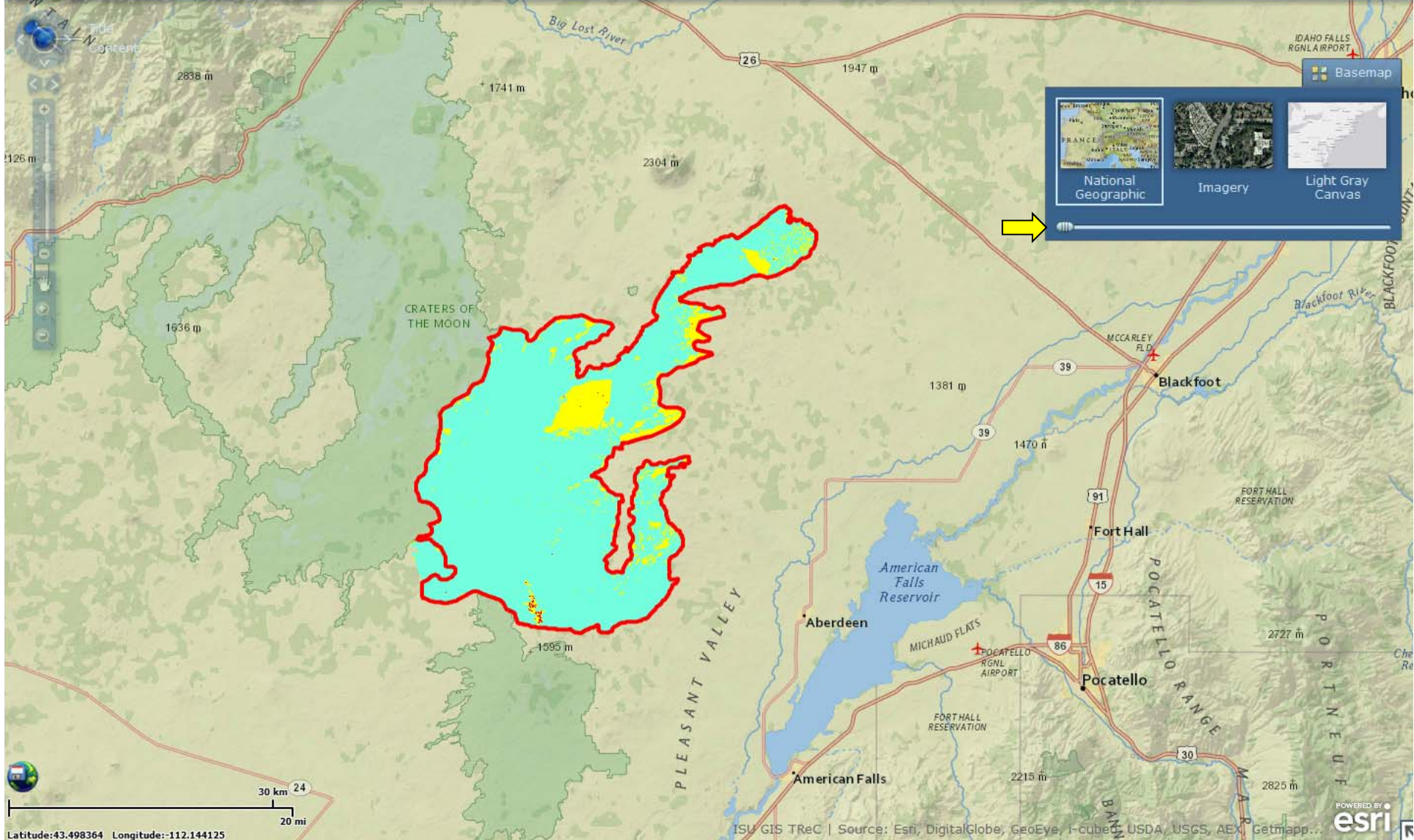
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[NASA GSFC](#)

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Latitude: 43.498364 Longitude: -112.144125

ISU GIS TRc | Source: Esri, DigitalGlobe, GeoEye, i-cube, USDA, USGS, AEX, Getmapp... **POWERED BY esri**





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



RECOVER

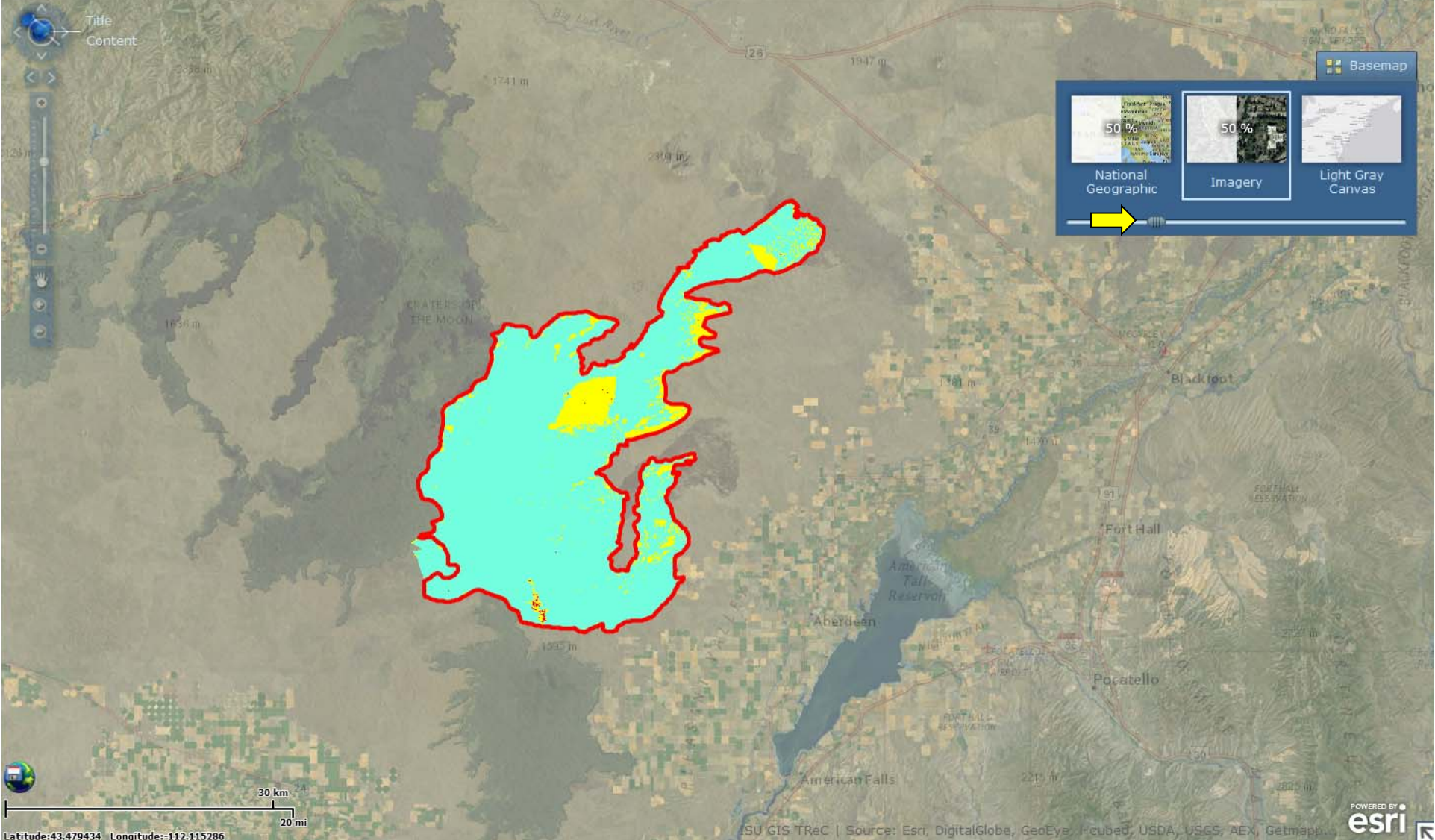
NASA GSFC

About

ISU GIS TRcC

BAER Tools

Title  
Content



Basemap

50 %  
National Geographic

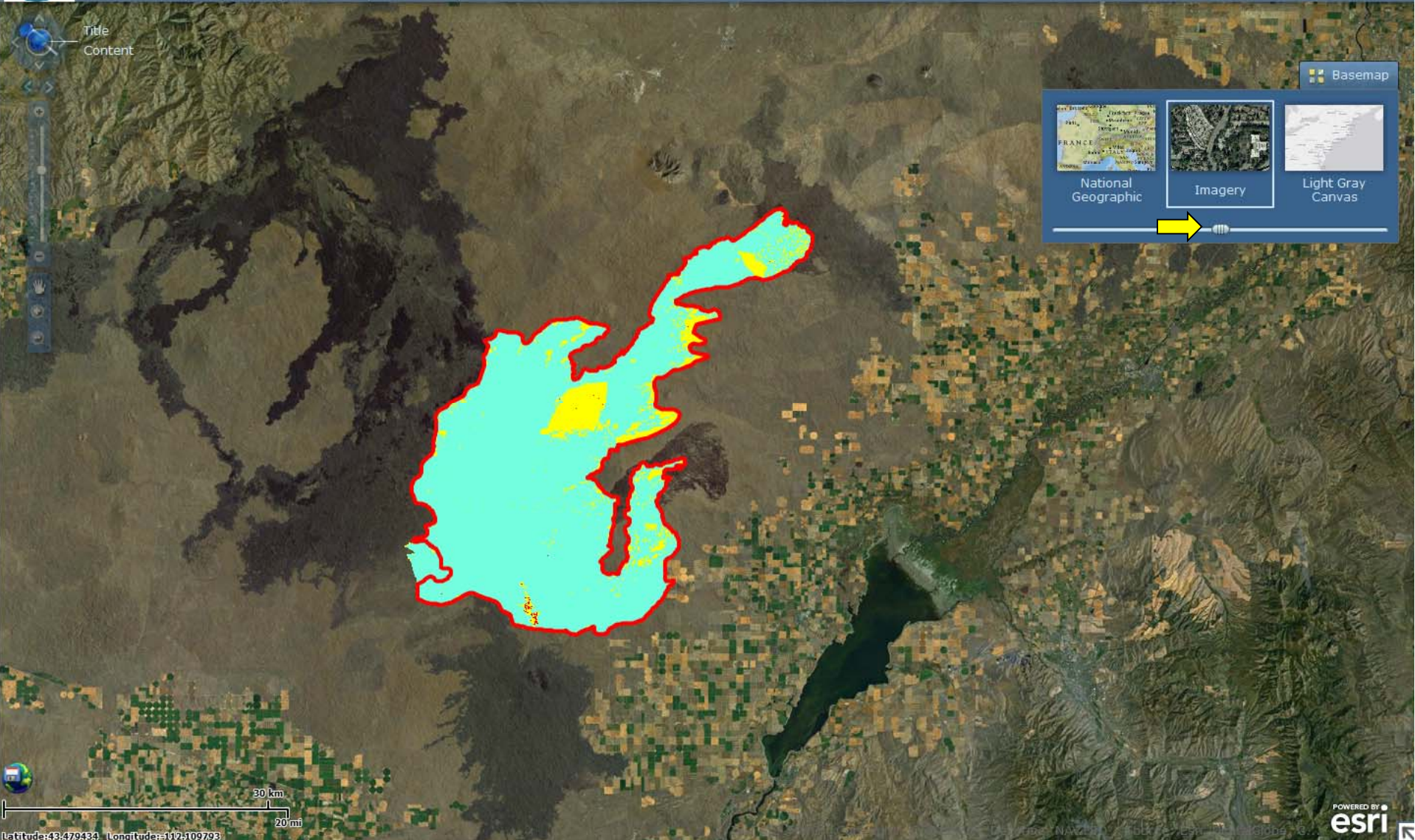
50 %  
Imagery

Light Gray Canvas

→

Latitude: 43.479434 Longitude: -112.115286





Title  
Content

Basemap

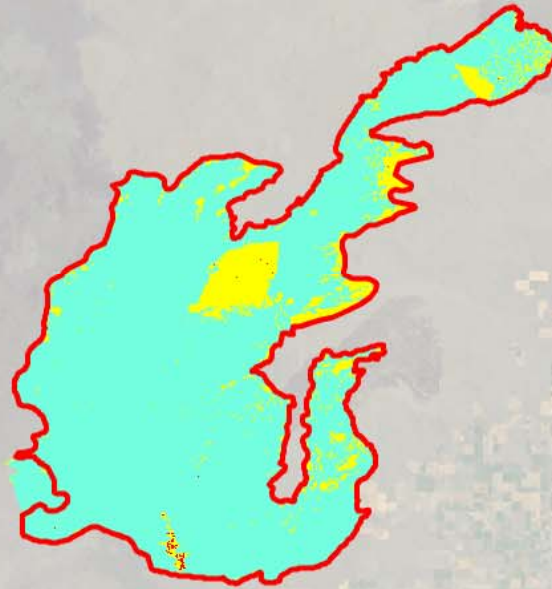
Basemap control panel with three options: National Geographic, Imagery, and Light Gray Canvas. A yellow arrow points to the Imagery option, and a slider is visible below the options.

30 km  
20 mi  
Latitude: 43.479434 Longitude: -112.109793





Info  
Content



Basemap

National Geographic Imagery Light Gray Canvas

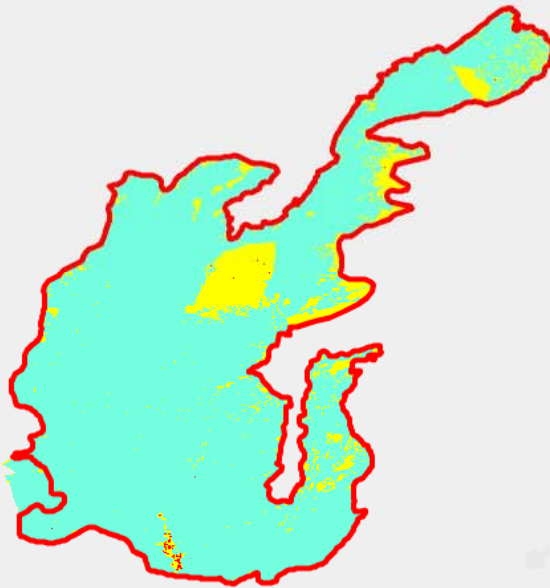
50% 50%

Latitude:43.479434 Longitude:-112.101553





Map navigation controls including a globe icon, a compass, a zoom slider, and a hand icon for panning.



Basemap selection menu with three options: National Geographic, Imagery, and Light Gray Canvas. A yellow arrow points to the right of the menu.

Scale bar showing 30 km and 20 mi, and coordinate information: Latitude: 43.478437 Longitude: -112.138632





# RECOVER: Crystal Fire (Beta)

Rehabilitation Capability Convergence for Ecosystem Recovery



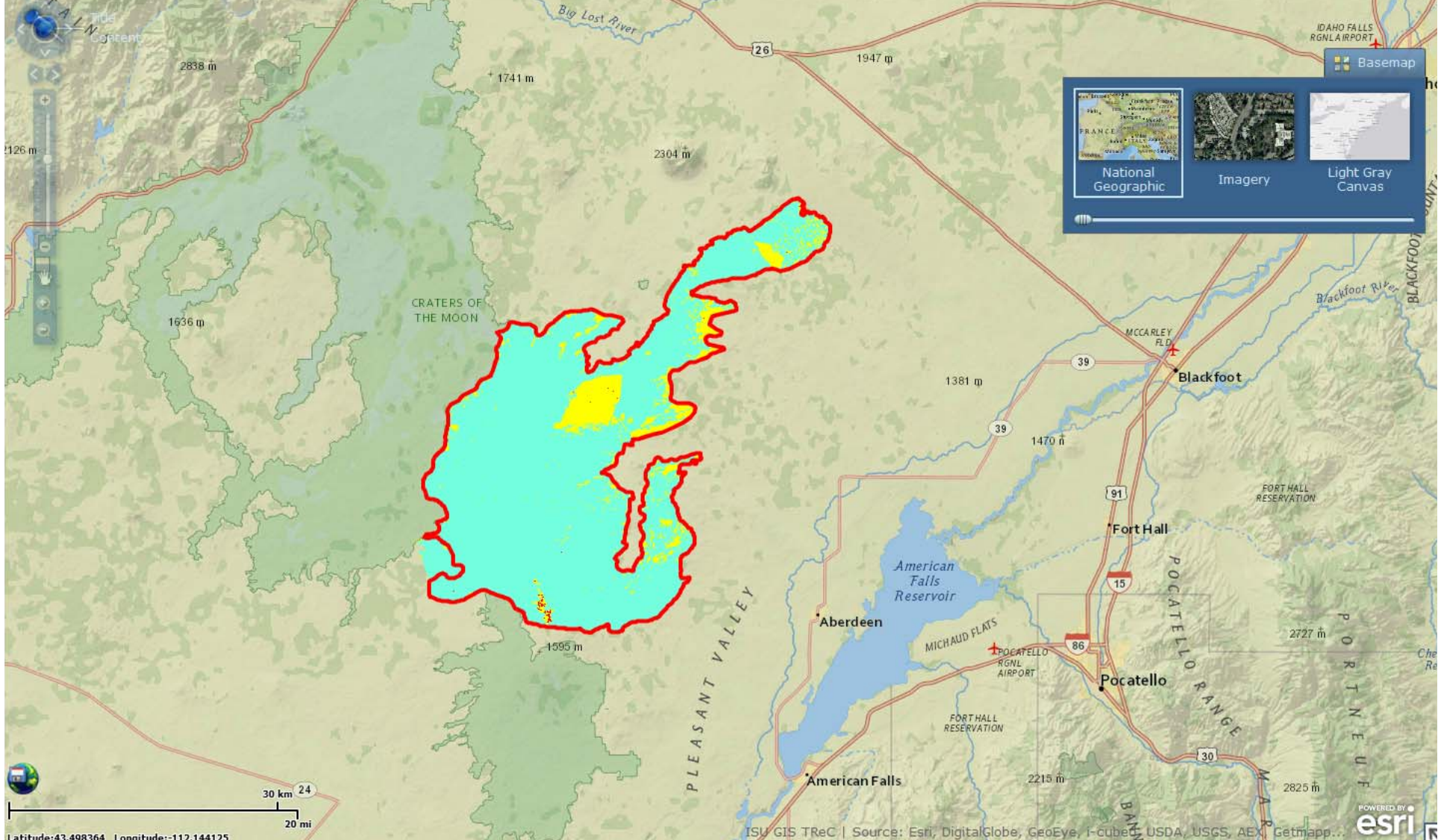
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Basemap

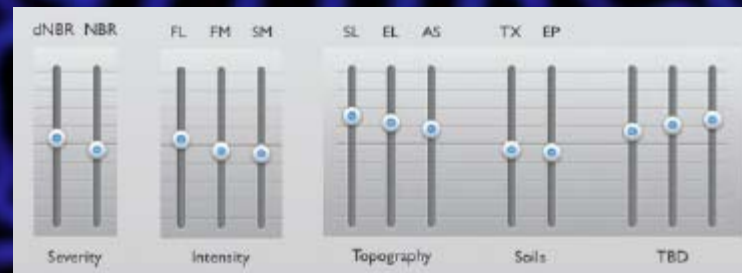
- National Geographic
- Imagery
- Light Gray Canvas

Latitude: 43.498364 Longitude: -112.144125

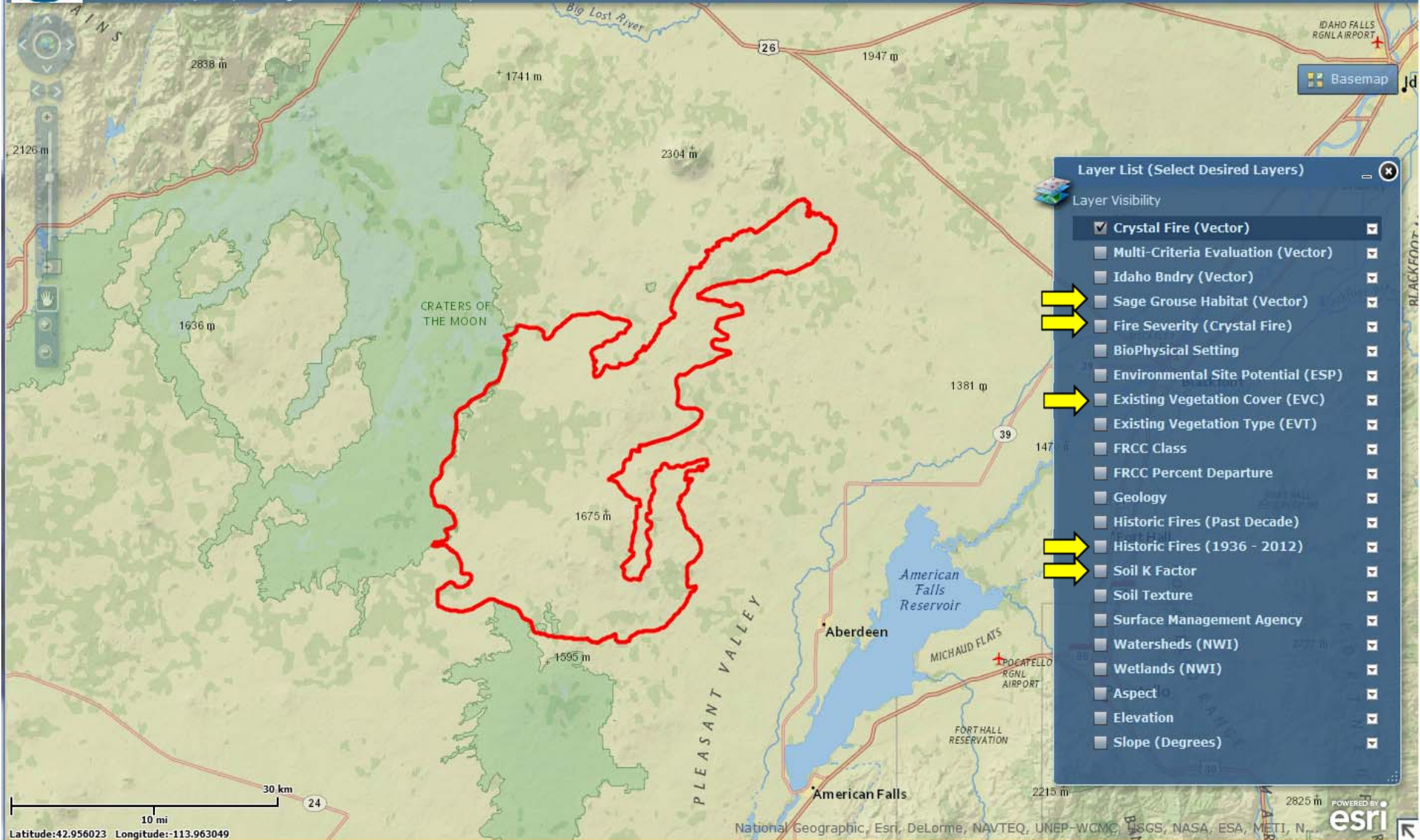


# Multi-Criteria Elevation Widget

- Custom analysis widget
  - End-user assigns weights to selected layers
  - Weights calculated via a geoprocessing service
  - Map symbology is updated to reflect changes







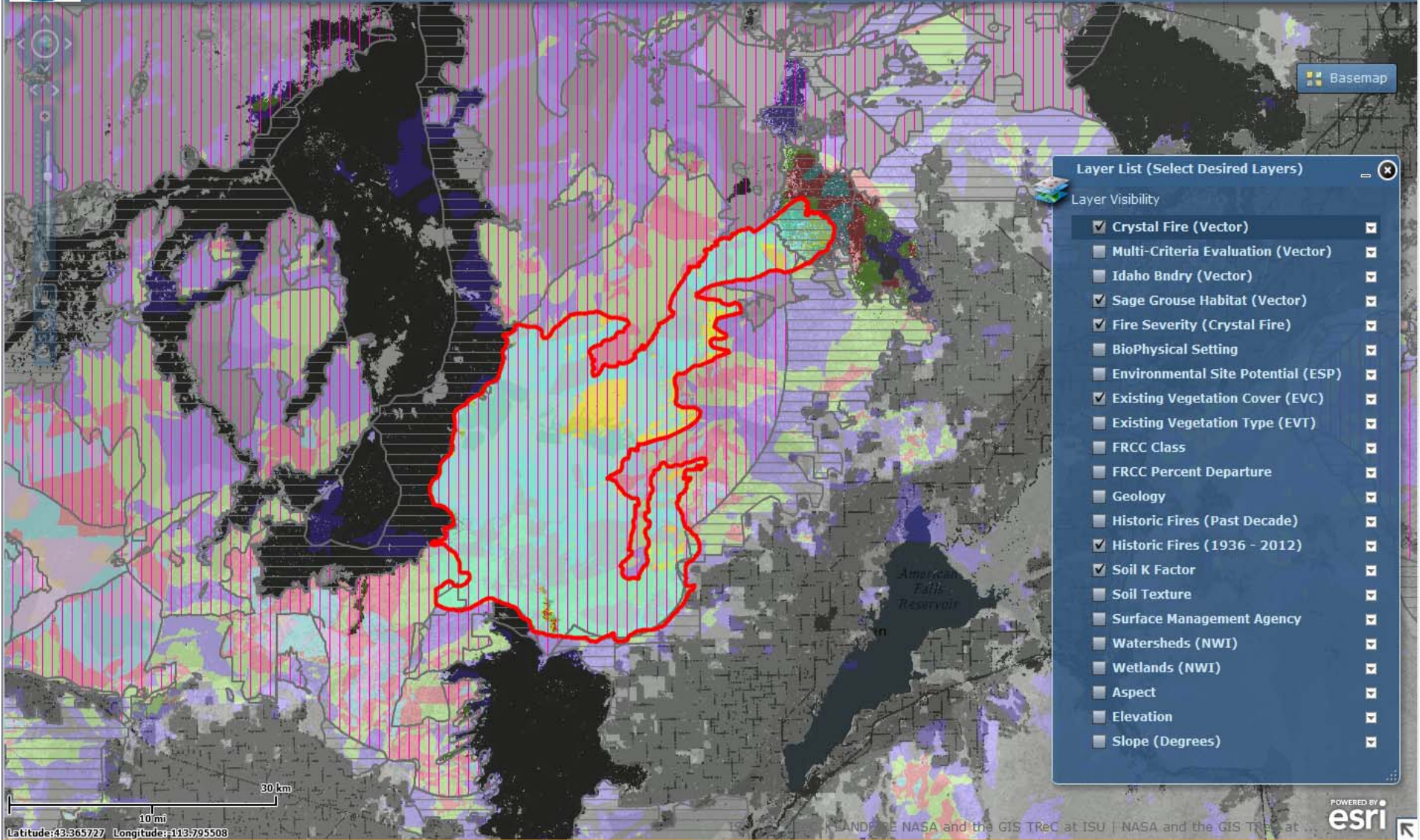
**Layer List (Select Desired Layers)**

Layer Visibility

- Crystal Fire (Vector)
- Multi-Criteria Evaluation (Vector)
- Idaho Bndry (Vector)
- Sage Grouse Habitat (Vector)
- Fire Severity (Crystal Fire)
- BioPhysical Setting
- Environmental Site Potential (ESP)
- Existing Vegetation Cover (EVC)
- Existing Vegetation Type (EVT)
- FRCC Class
- FRCC Percent Departure
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- Historic Fires (1936 - 2012)
- Soil K Factor
- Soil Texture
- Surface Management Agency
- Watersheds (NWI)
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)







Layer List (Select Desired Layers)

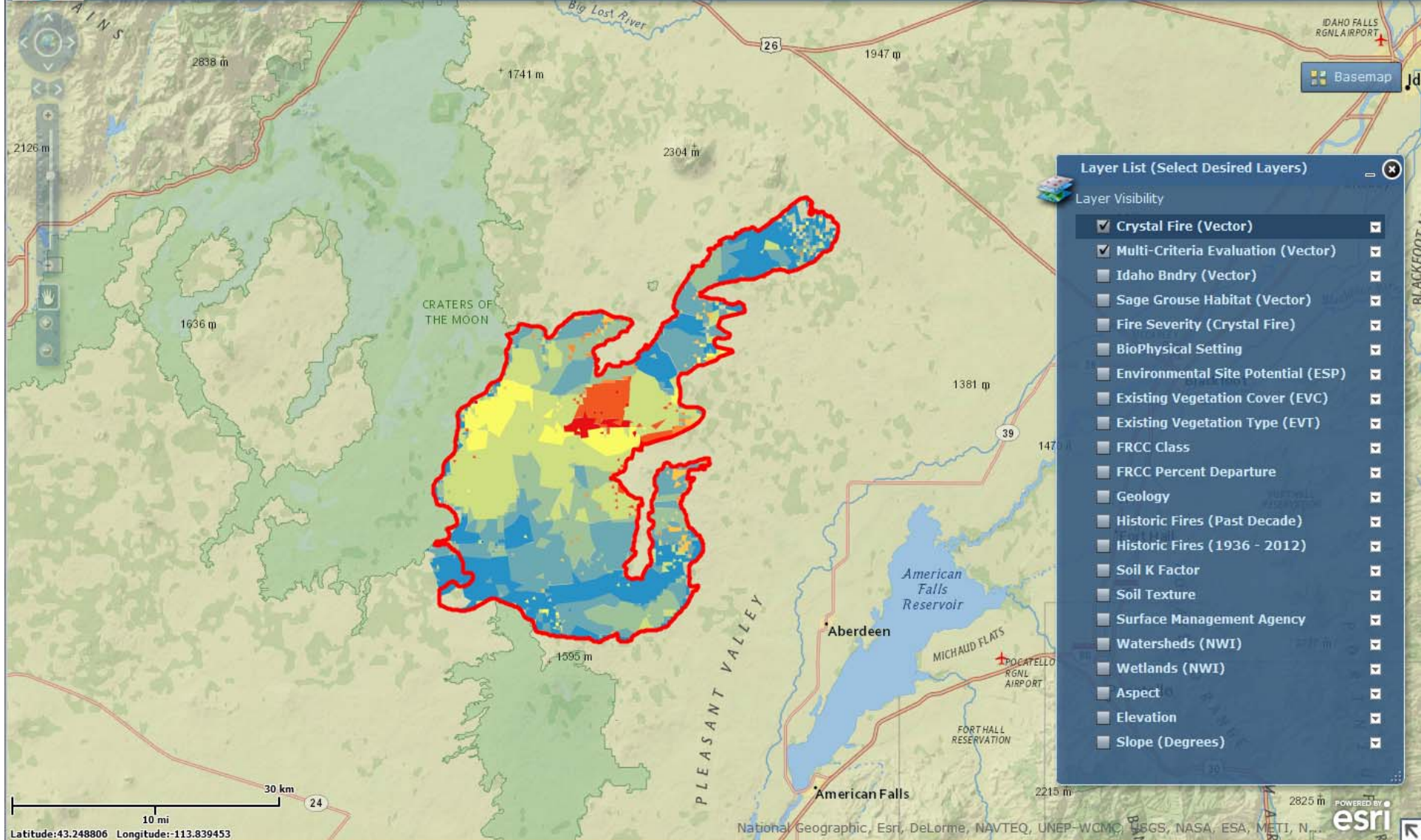
Layer Visibility

- Crystal Fire (Vector)
- Multi-Criteria Evaluation (Vector)
- Idaho Bndry (Vector)
- Sage Grouse Habitat (Vector)
- Fire Severity (Crystal Fire)
- BioPhysical Setting
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- Historic Fires (1936 - 2012)
- Soil K Factor
- Soil Texture
- Surface Management Agency
- Watersheds (NWI)
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)



Latitude: 43.365727 Longitude: -113.795508





**Layer List (Select Desired Layers)**

Layer Visibility

- Crystal Fire (Vector)
- Multi-Criteria Evaluation (Vector)
- Idaho Bndry (Vector)
- Sage Grouse Habitat (Vector)
- Fire Severity (Crystal Fire)
- BioPhysical Setting
- Environmental Site Potential (ESP)
- Existing Vegetation Cover (EVC)
- Existing Vegetation Type (EVT)
- FRCC Class
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- Geology
- Historic Fires (Past Decade)
- Historic Fires (1936 - 2012)
- Soil K Factor
- Soil Texture
- Surface Management Agency
- Watersheds (NWI)
- Wetlands (NWI)
- Aspect
- Elevation
- Slope (Degrees)

Latitude: 43.248806 Longitude: -113.839453



# Using a Weighted MCE

Weighted Sum

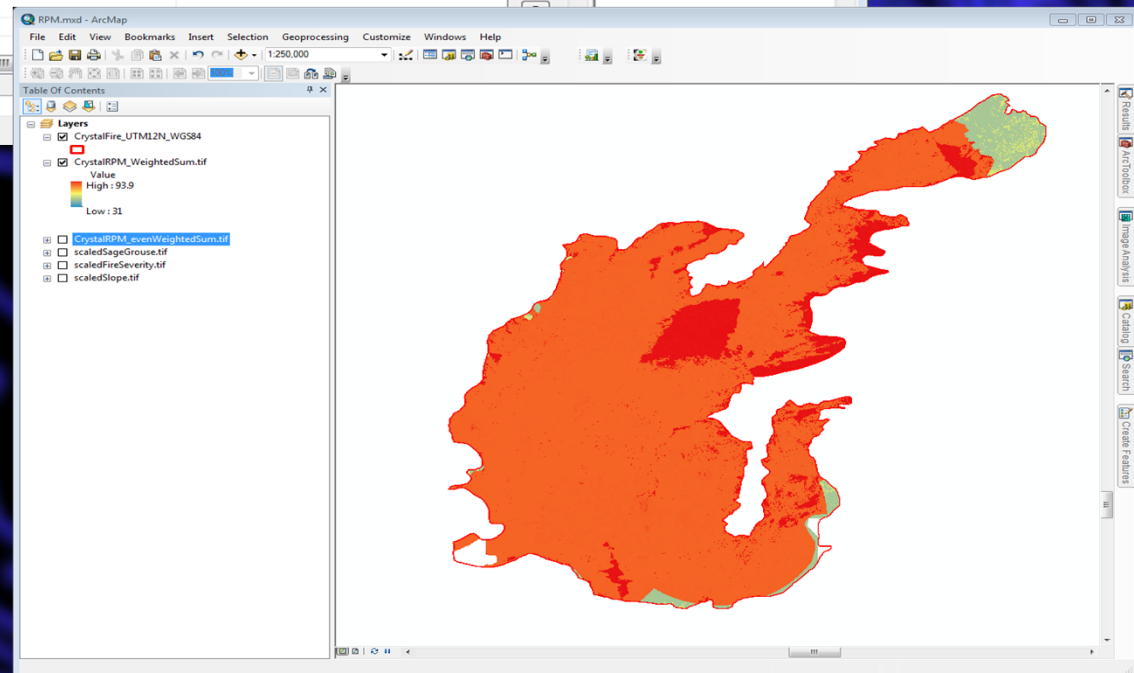
Input rasters

Raster	Field	Weight
scaledSageGrouse.tif	VALUE	0.6
scaledFireSeverity.tif	VALUE	0.3
scaledSlope.tif	VALUE	0.1

Output raster

The output suitability raster.  
It will be of floating point type.

Output raster  
C:\Data\GIS\WASA\_RECOVER\RPM\CrystalRPM\_WeightedSum.tif







# AQUEDUCT™

Measuring and Mapping Water Risk

[Home](#)

[Map](#)

[How-To](#)

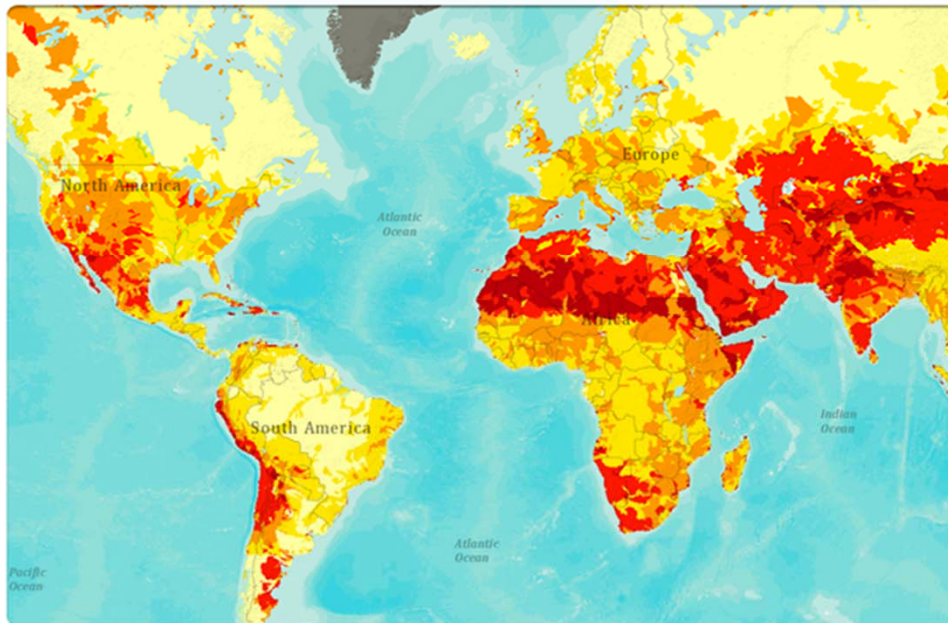
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Measuring, mapping, and understanding water risks around the globe



Aqueduct's global water risk mapping tool helps companies, investors, governments, and other users understand where and how water risks and opportunities are emerging worldwide.

[Launch the Maps](#)





Water Risk

Projected Change

Show Basin Studies

Water News

Download Data

Share

Print

Info

Basemaps

Weight Distribution



Customize Indicator Weights

Physical Risk QUANTITY

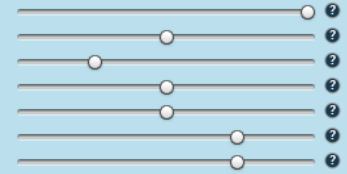
Indicators

- Baseline Water Stress
- Inter-annual Variability
- Seasonal Variability
- Flood Occurrence
- Drought Severity
- Upstream Storage
- Groundwater Stress

Physical Risk QUALITY

Regulatory & Reputational Risk

Weights



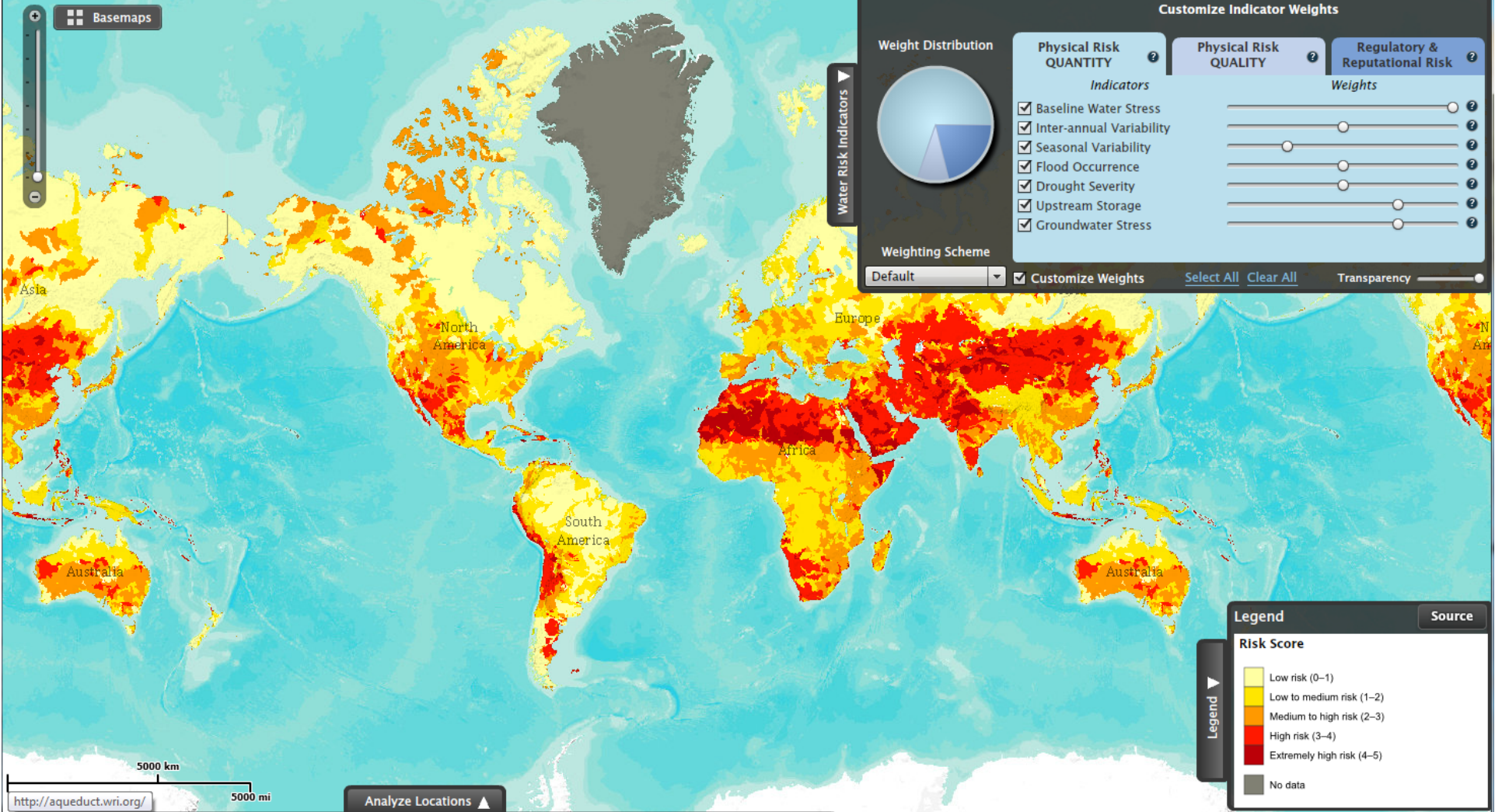
Weighting Scheme

Default

Customize Weights

Select All Clear All

Transparency



Legend

Source

Risk Score

- Low risk (0-1)
- Low to medium risk (1-2)
- Medium to high risk (2-3)
- High risk (3-4)
- Extremely high risk (4-5)
- No data

5000 km

5000 mi

http://aqueduct.wri.org/

Analyze Locations



Water Risk

Projected Change

Show Basin Studies

Water News

Download Data

Share

Print

Info

Basemaps

Weight Distribution



Weighting Scheme

Custom

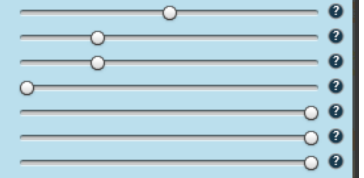
Physical Risk QUANTITY

Indicators

- Baseline Water Stress
- Inter-annual Variability
- Seasonal Variability
- Flood Occurrence
- Drought Severity
- Upstream Storage
- Groundwater Stress

Physical Risk QUALITY

Weights



Regulatory & Reputational Risk

Weights



Customize Weights

Select All Clear All

Transparency

Customize Indicator Weights

Water Risk Indicators

Asia

North America

Europe

South America

Africa

Australia

Australia

Legend

Source

Risk Score

- Low risk (0-1)
- Low to medium risk (1-2)
- Medium to high risk (2-3)
- High risk (3-4)
- Extremely high risk (4-5)
- No data

5000 km

5000 mi

Analyze Locations



# Future Options

- Apps for tablets and mobile devices
  - (initially focusing on iPads and Android based devices)
- Additional spatial analysis tools/widgets



# Questions?



- [http://giscenter.isu.edu/research/Techpg/nasa\\_RECOVER](http://giscenter.isu.edu/research/Techpg/nasa_RECOVER)
- [haskgeor@isu.edu](mailto:haskgeor@isu.edu)
- [webekeit@isu.edu](mailto:webekeit@isu.edu)

