



# Leveraging ArcGIS Online Elevation and Hydrology Services

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# Topics

- **An overview of ArcGIS Online Elevation Analysis**
- **Using Elevation Analysis Services in ArcGIS for Desktop**
- **Using Elevation Analysis Services in Web Applications**

# What are elevation analysis services?

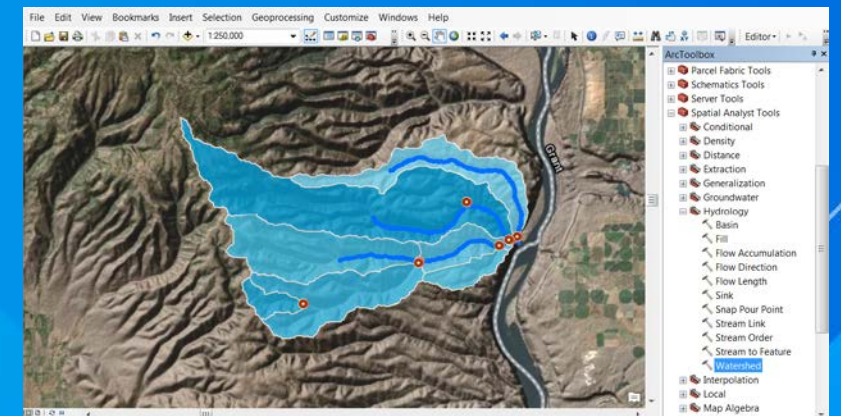
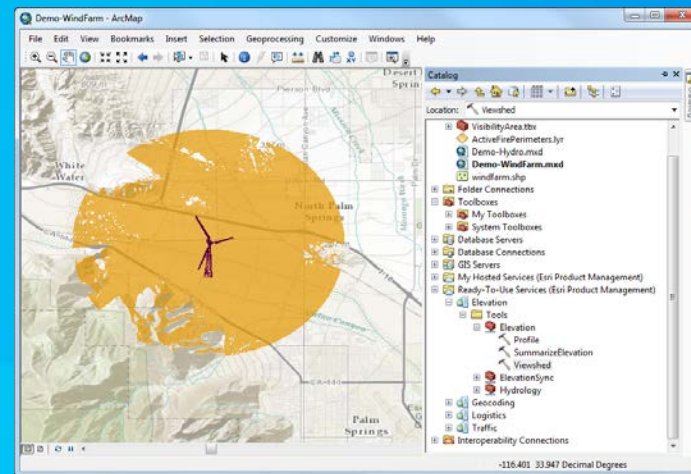
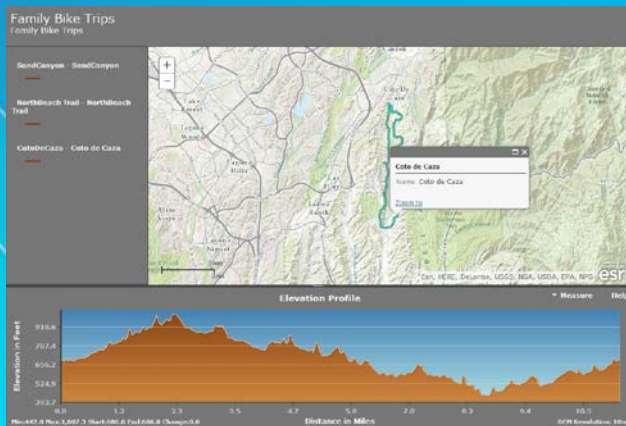
- Analytical operations hosted by ArcGIS Online against Esri hosted elevation and hydrologic data



## ArcGIS Online Elevation Analysis

# Solving real world problems

- What is the elevation along a particular path?
- What is the slope of a road?
- Where are the visible areas from an observation tower?
- Where does the water come from and flow to?



# Accessible across the ArcGIS platform

- Available to all ArcGIS Online users with organizational accounts across the ArcGIS platform
  - Profile service is free
  - All other services will consume credits



# What comes with elevation analysis services?

Ready-to-use services and sample add-in

- Makes it easier for desktop users to perform analysis on elevation data

Web mapping template

- Quick and easy way for ArcGIS Online users to create a web application using the profile service

REST API

- Allows developers to build custom web applications

Data

- Elevation and hydrology data hosted and maintained by Esri

# The authoritative data

- From the authoritative sources
- Global data coverage at different resolution
- Optimized for fast web service performance



**HydroSHEDS**



# Why use elevation analysis services?

## Data

- Authoritative data
- No need to worry about collecting, maintaining, and updating the data

## Usability

- Ready-To-Use in Desktop
- Previously complex workflow simplified
- Web application template

## Accessibility

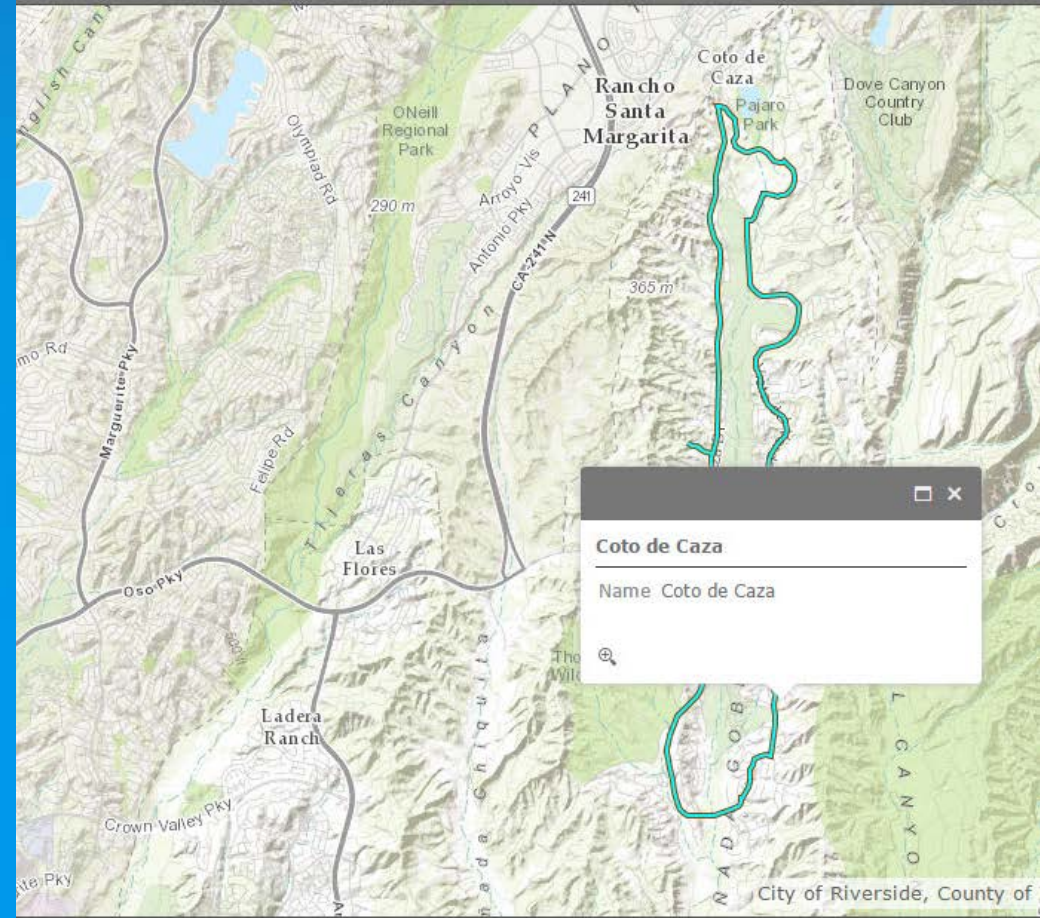
- Available as web services
- Can be accessed across the ArcGIS Platform



Demo

# Exploring Bike Trails

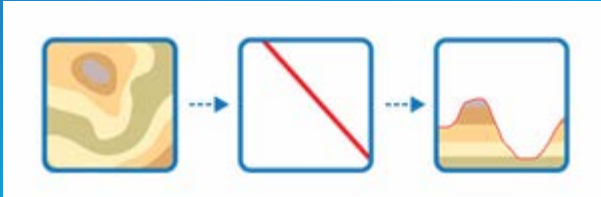
Using Elevation Profile Service



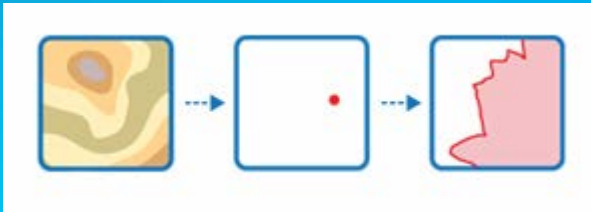
# Services Available

## Elevation Analysis

### Profile



### Viewshed

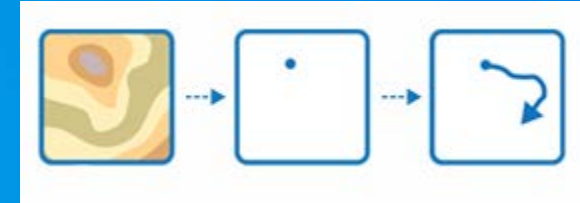


### Summarize Elevation



## Hydrologic Analysis

### Watershed



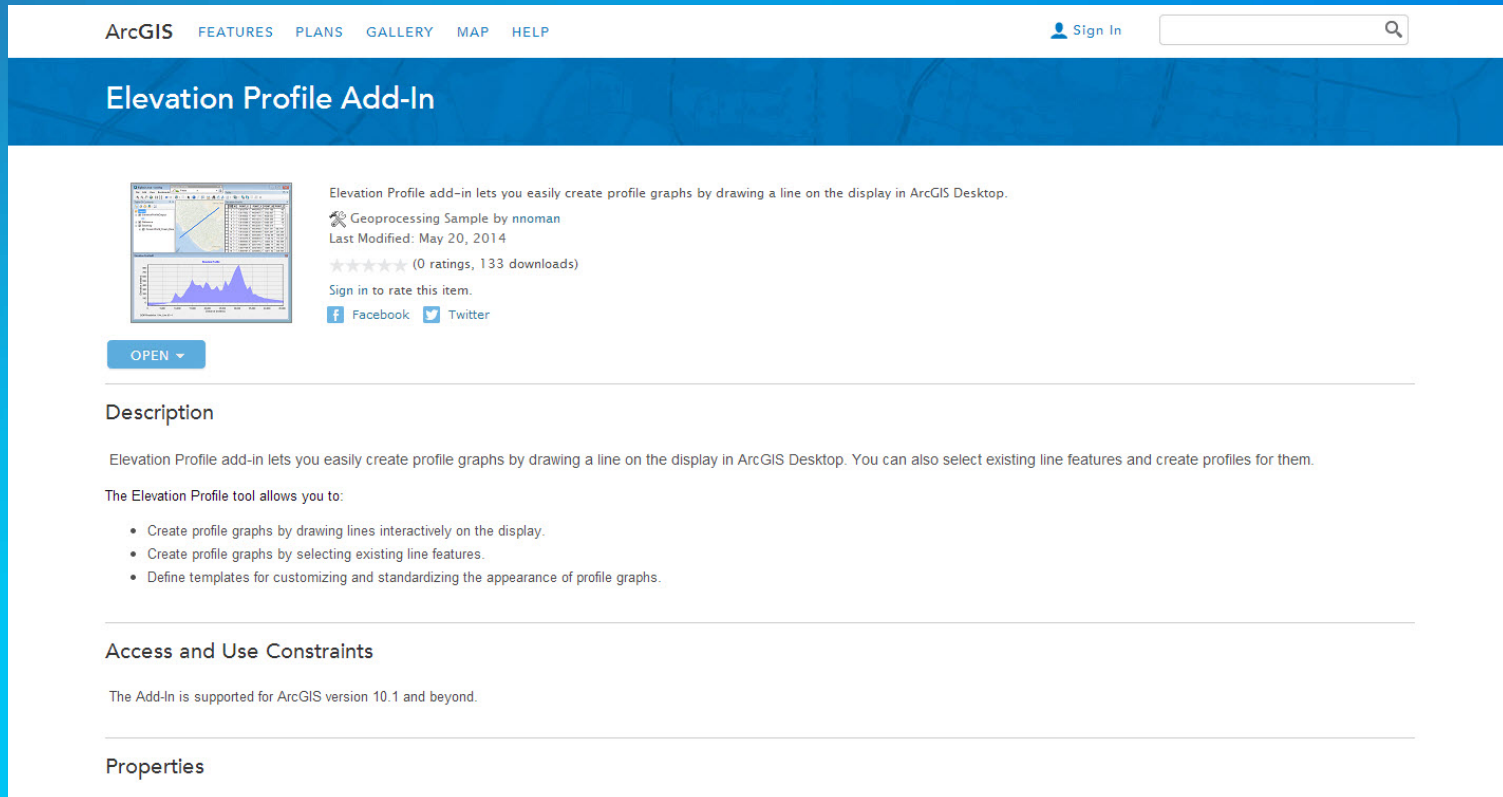
### Trace Downstream



# Using Elevation Analysis services in ArcGIS for Desktop

# Using profile service in ArcGIS for Desktop

- Available via free sample add-in



ArcGIS FEATURES PLANS GALLERY MAP HELP Sign In

## Elevation Profile Add-In

Elevation Profile add-in lets you easily create profile graphs by drawing a line on the display in ArcGIS Desktop.

Geoprocessing Sample by nnoman  
Last Modified: May 20, 2014

★★★★★ (0 ratings, 133 downloads)

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### Description

Elevation Profile add-in lets you easily create profile graphs by drawing a line on the display in ArcGIS Desktop. You can also select existing line features and create profiles for them.

The Elevation Profile tool allows you to:

- Create profile graphs by drawing lines interactively on the display.
- Create profile graphs by selecting existing line features.
- Define templates for customizing and standardizing the appearance of profile graphs.

### Access and Use Constraints

The Add-In is supported for ArcGIS version 10.1 and beyond.

### Properties

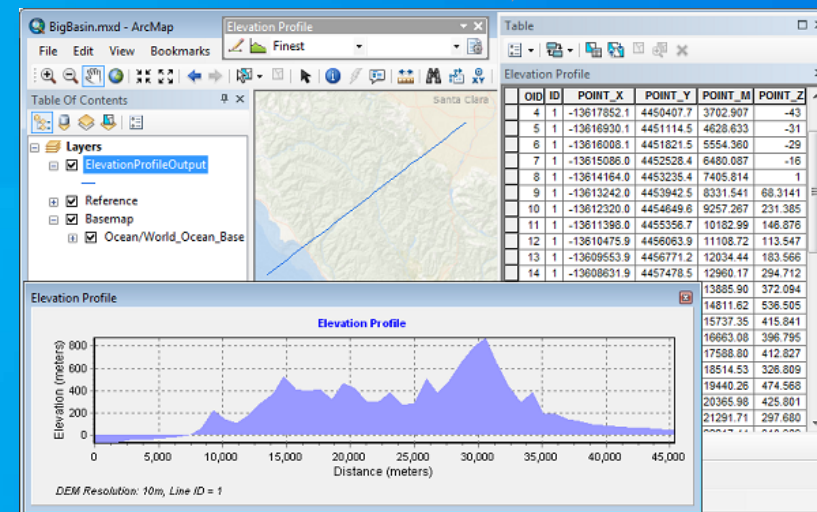
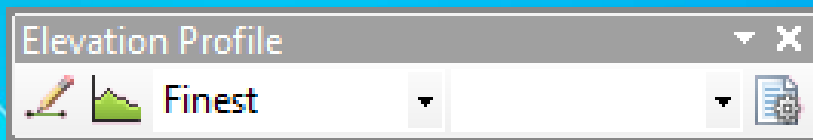
<http://esriurl.com.ElevationProfileAddIn>

# Using profile service in ArcGIS for Desktop

Download the elevation profile add-in for ArcGIS Desktop

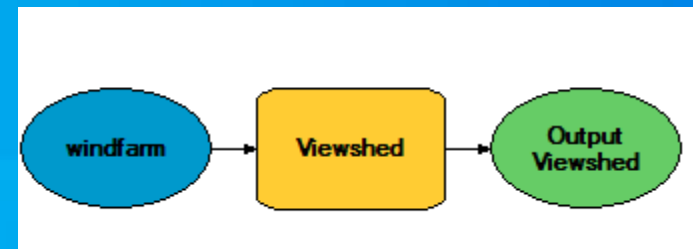
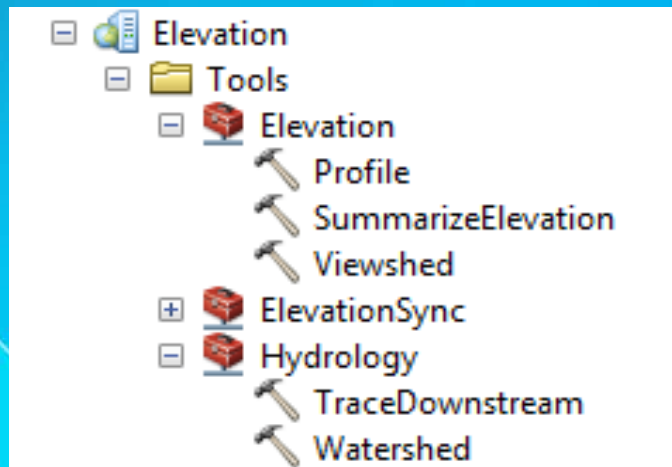
Install the add-in

Use Elevation Profile toolbar and create profile graph

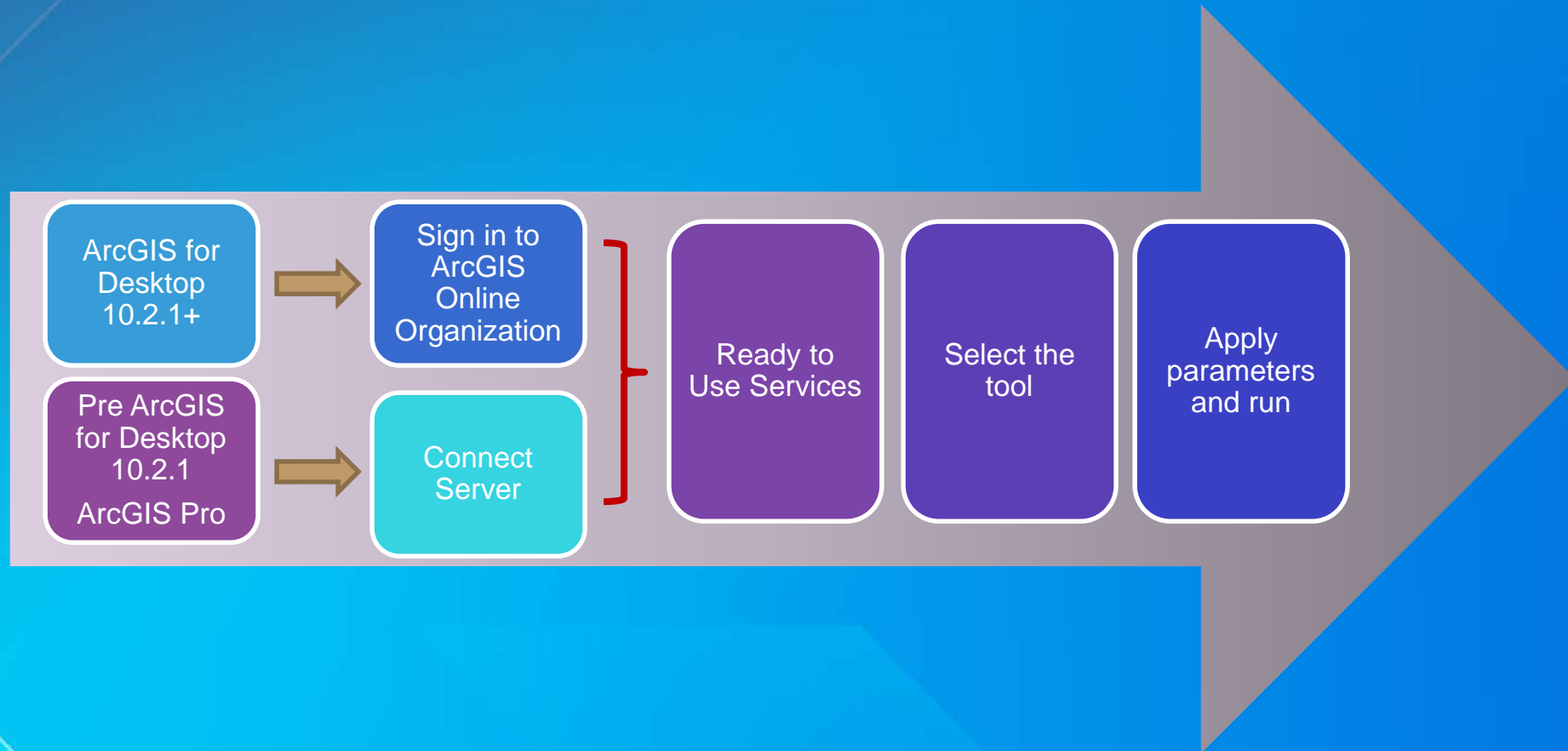


## The other elevation services ...

- Other elevation analysis services are accessed in ArcGIS for Desktop as ArcGIS Online Ready-To-Use services
  - Requires ArcGIS Online for Organizations
- Used like any other geoprocessing tool
  - Include in Model builder, python scripts...

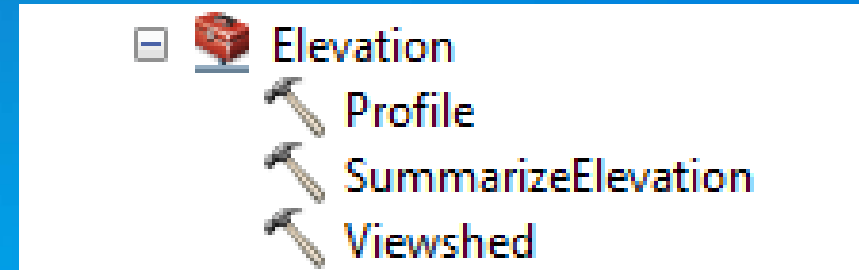


# Ready to use services - The steps



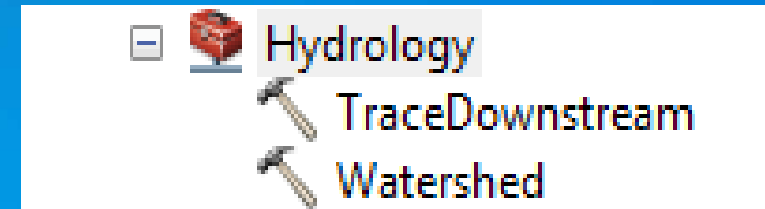
# Terrain analysis tools

- **Profile**
  - Explore elevation along a path
- **SummarizeElevation**
  - Calculate summary statistics including elevation, slope, and aspect for user specified features
- **Viewshed**
  - Identify visible areas based on user provided observation points





# Hydrologic analysis tools



- **TraceDownstream**

- Determine the downstream path of water across the landscape from a user specified point. Where does the water flow to?

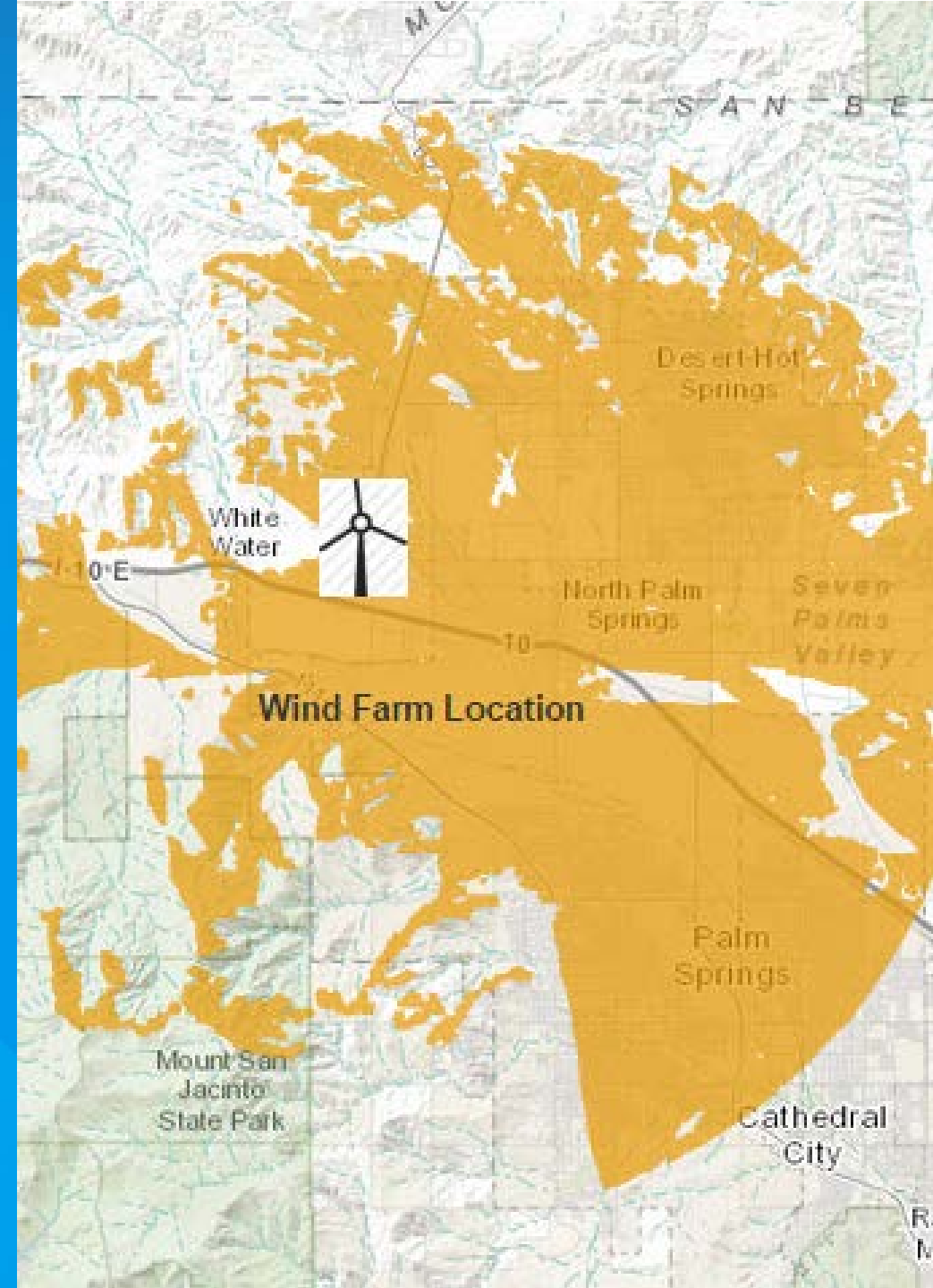
- **Watershed**

- Determine the upslope area that contributes flow above each user specified point. Where does the water come from?

Demo

# Wind Farm Visibility Analysis

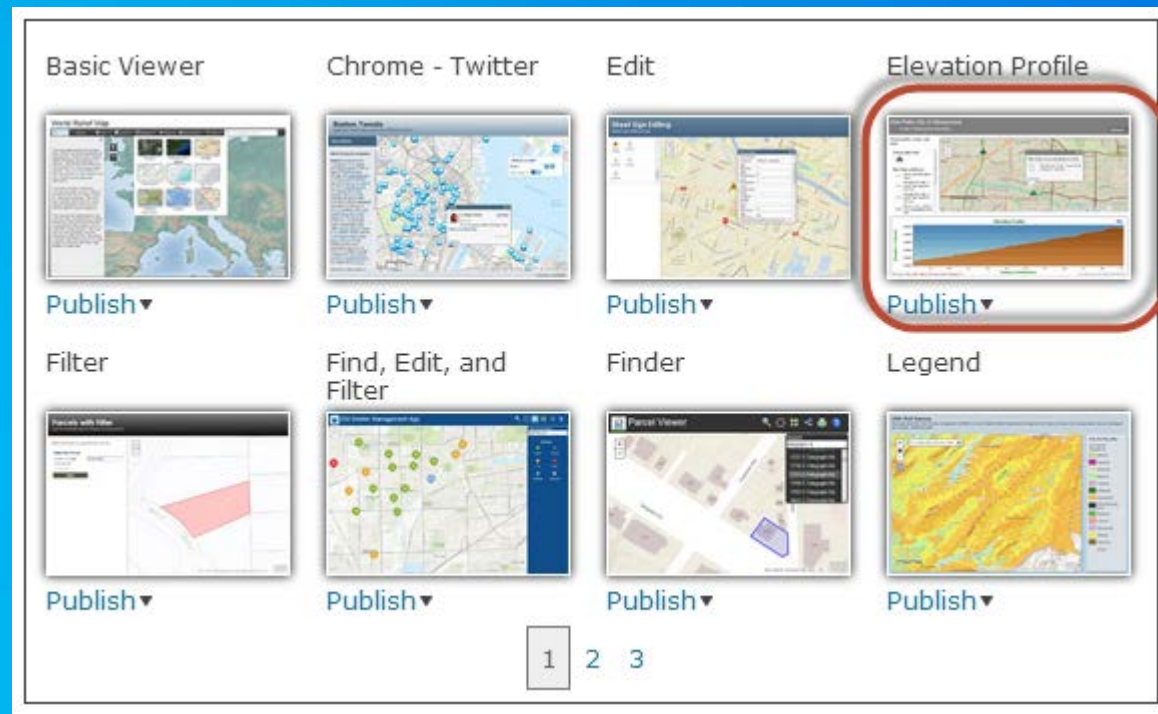
Using Elevation Service in ArcGIS for  
Desktop



# Using Elevation Analysis services in web applications

# ArcGIS Online web map and application template

- Elevation profile template
- Downloadable and configurable
- Use with publicly shared maps
- Available in Javascript API and Web AppBuilder



# How to use the elevation analysis services API

- Choose any language that can make HTTP requests
  - Use the REST API reference to understand parameters, input values, and syntax
- Also available in JavaScript API under /analysis

The screenshot shows the ArcGIS REST API documentation for Elevation Analysis services. The page title is "ArcGIS REST API: Elevation Analysis services". The navigation bar includes "Home" and "API Reference". The main content area is divided into sections: "Getting Started" (with a sub-section "Getting started with Elevation Analysis services"), "Elevation tasks" (with sub-sections "Profile", "Summarize Elevation", and "Viewshed"), "Hydrology tasks" (with sub-sections "Trace Downstream" and "Watershed"), and "ElevationSync tasks". The "Getting Started" section contains a paragraph: "The Elevation Analysis services provide a group of capabilities for performing analytical operations against data hosted and curated by Esri. This allows you to perform certain common analytical tasks quickly and easily, without having to collect, maintain or update an authoritative set of base data. We do that part for you!". The "Elevation tasks" section contains a paragraph: "ArcGIS is a platform for geographic analysis and mapping. The ArcGIS platform is available in desktop and devices because it exposes much of its functionality through web services. To develop with the ArcGIS REST API, you should be familiar with the ArcGIS REST API."

The screenshot shows the ArcGIS API for JavaScript documentation for the CreateViewshed class. The page title is "ArcGIS API for JavaScript". The navigation bar includes "Home", "Guide", "API Reference", and "Sample Code". The main content area is divided into sections: "Getting Started", "Elevation tasks", "Hydrology tasks", and "ElevationSync tasks". The "Getting Started" section contains a paragraph: "The Elevation Analysis services provide a group of capabilities for performing analytical operations against data hosted and curated by Esri. This allows you to perform certain common analytical tasks quickly and easily, without having to collect, maintain or update an authoritative set of base data. We do that part for you!". The "Elevation tasks" section contains a paragraph: "ArcGIS is a platform for geographic analysis and mapping. The ArcGIS platform is available in desktop and devices because it exposes much of its functionality through web services. To develop with the ArcGIS REST API, you should be familiar with the ArcGIS REST API."

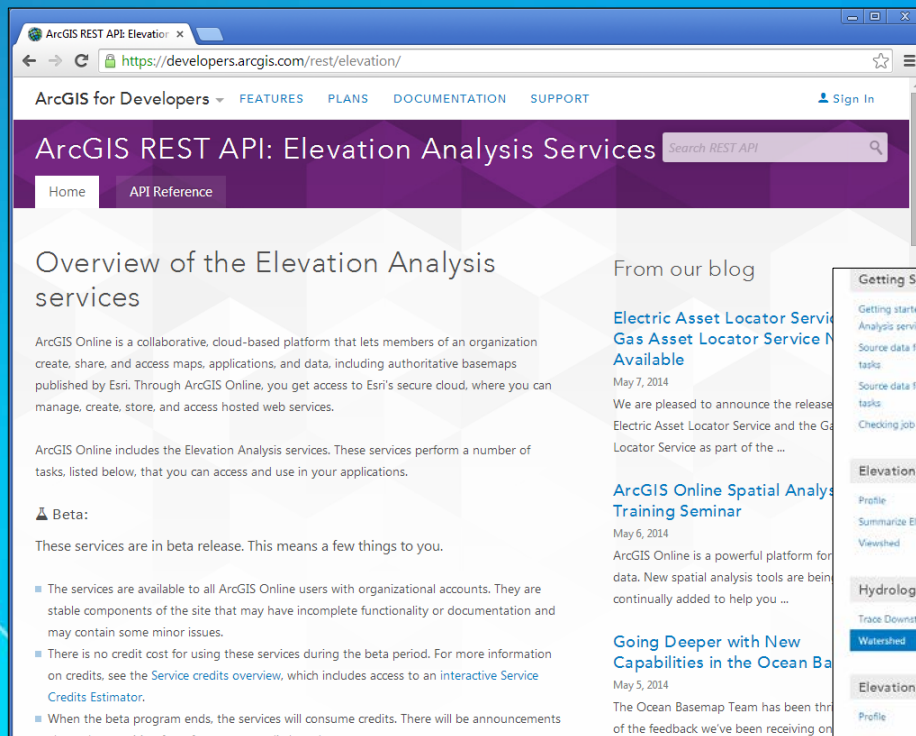
The "Available services" section contains a paragraph: "There are two general categories of Elevation Analysis services available that you can perform with the ArcGIS REST API. One category consists of elevation analysis tools which operate on authoritative digital elevation models to derive surface area, slope, aspect, and other terrain information. The other services are used for hydrologic analysis and use information to model the movement of water across the landscape for delineating watershed boundaries and flow paths."

The "Elevation tasks" section contains a paragraph: "ArcGIS is a platform for geographic analysis and mapping. The ArcGIS platform is available in desktop and devices because it exposes much of its functionality through web services. To develop with the ArcGIS REST API, you should be familiar with the ArcGIS REST API."

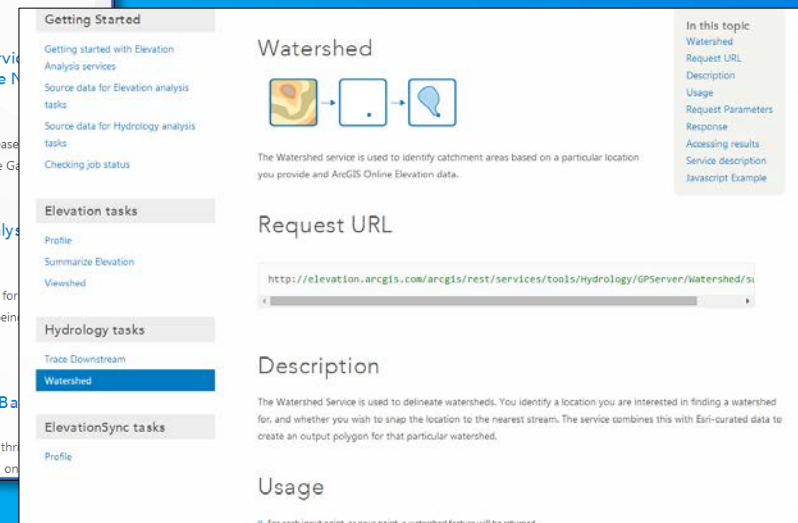
The "Class: CreateViewshed" section includes a "Print this page" link, a "[AMD Module Require | Legacy Module Require]" label, and links for "Constructors | Properties | Methods | Events". The "Description" section contains a paragraph: "(Added at v3.12) Creates areas that are visible based on locations you specify." The "Samples" section contains a paragraph: "Search for samples that use this class."

# Where to find help

- ArcGIS for Developers online documentation
- Sample applications with source code



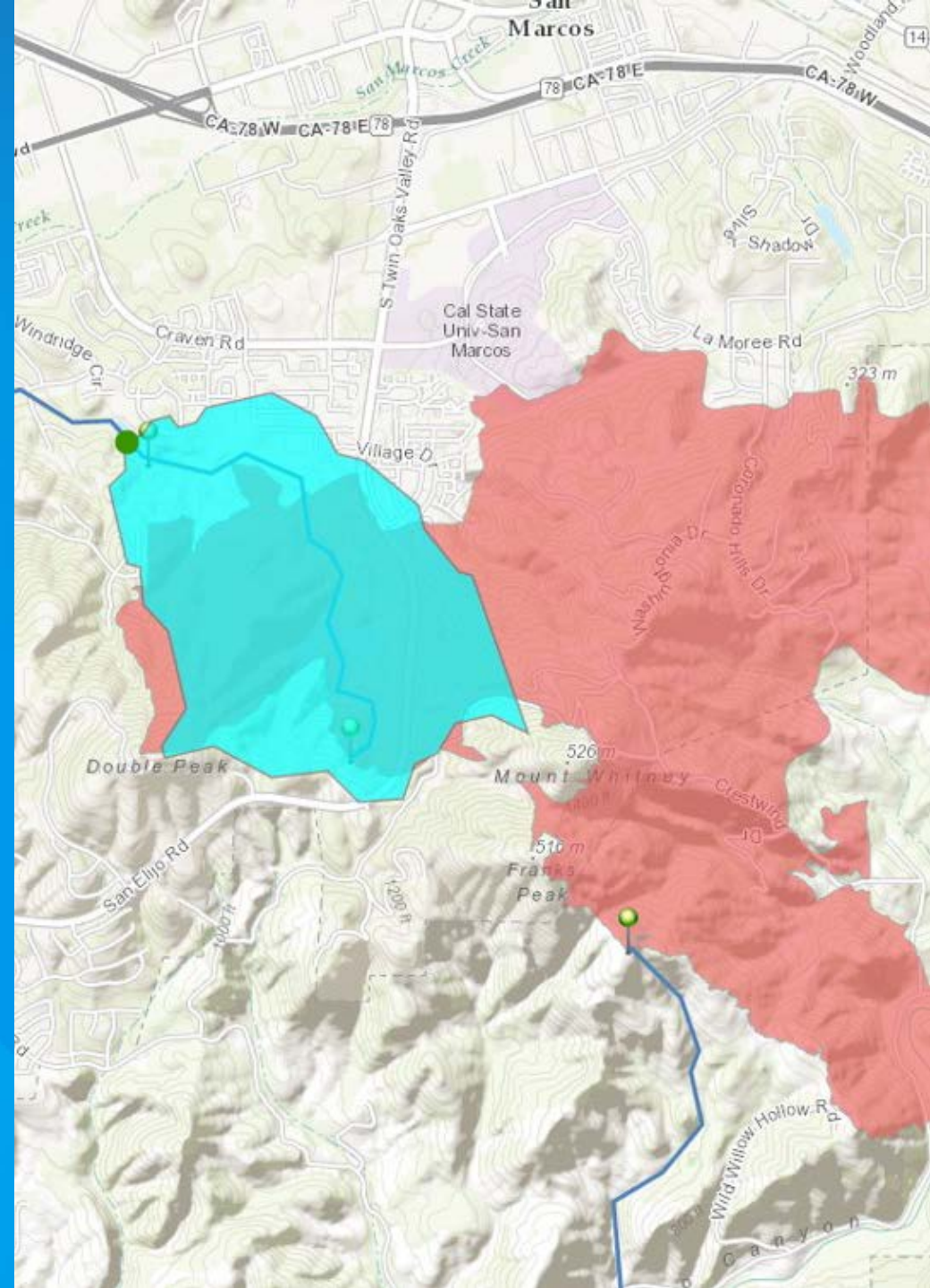
[developers.arcgis.com/rest/elevation](https://developers.arcgis.com/rest/elevation)



Demo

# Post Wildfire Hydrologic Analysis

Using ArcGIS Hydrologic Service



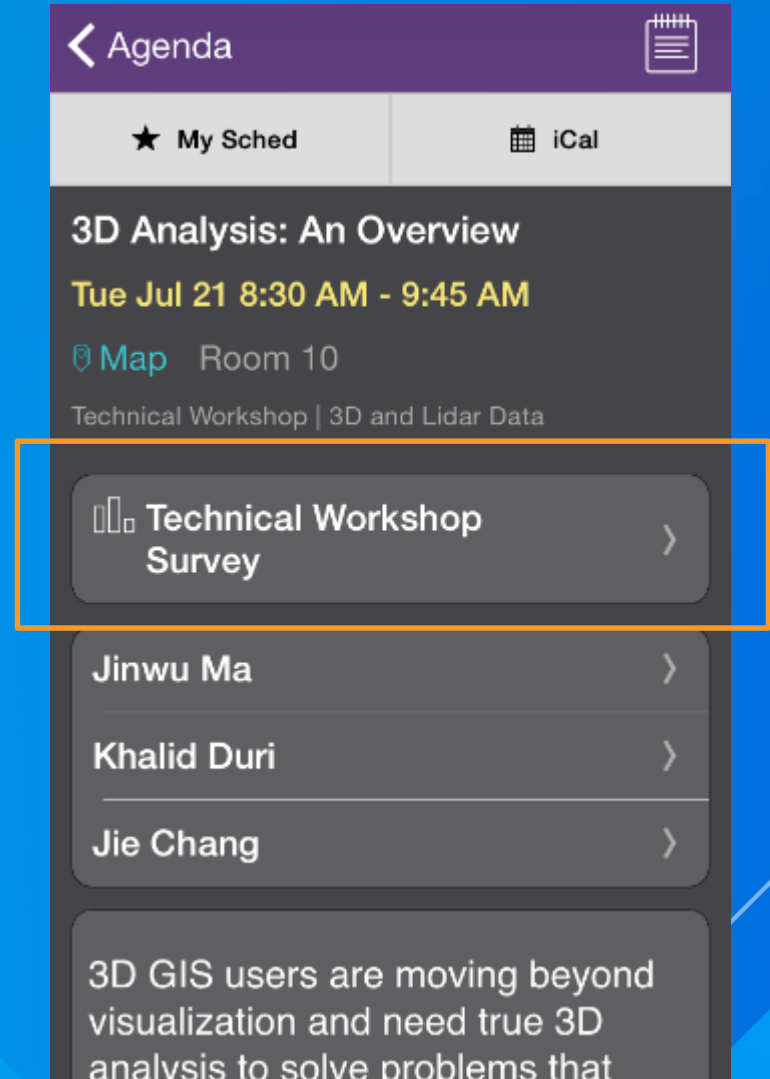
# Summary

- **Analysis and data hosted in ArcGIS Online**
- **Use in Desktop, Web, or Mobile clients**
- **More areas at higher resolutions in the future through the Community Maps Program**



# Thank you...

- Please fill out the session survey in your mobile app
- Select [Leveraging ArcGIS Online Elevation and HydrologyServices] in the Mobile App
  - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments





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