WHAT TO KNOW ABOUT GIS IN UTAH

As Utah's map technology coordination office, the Automated Geographic Reference Center (AGRC) provides a wide range of GIS and other geospatial support services, including providing training on Utah GIS. As part of that educational role, AGRC has developed this document to provide links to relevant Utah GIS websites and information.

GENERAL AGRC RESOURCES

- 📍 **AGRC**: The AGRC website is Utah's GIS data clearinghouse.
- 📍 **Open Data**: AGRC's Open Data site is the State Geographic Information Database (SGID) (i.e., all Utah vector data) served up through ArcGIS Online.
- 📍 **Open SGID**: The Open SGID is a cloud hosted, publicly available PostGIS database containing SGID data.
- 📍 **Raster Discovery Application**: AGRC's Raster Discovery Application allows users to search and download aerial photography, elevation data, and USGS topographic maps for a user-defined area of interest.

AGRC's Discover Imagery and Base Map Server Resources

- 📍 **AGRC's Base Map and Imagery Services**: Discover provides imagery and base maps services in Open Geospatial Consortium (OGC) standard Web Map Tile Service (WMTS) and Web Map Service (WMS) in the Web Mercator WGS84 projection (wkid: 3857). This page provides general background information on Discover and explains how to <u>sign up for access to Discover</u>.
- 📍 **Discover Server Resources and Information**: Once users have signed up for Discover, they can check out this page to learn everything there is to know about consuming the services available from Discover.

LOCAL GIS USER GROUPS

- 👥 Utah Geographic Information Council (UGIC)
- 👥 Salt Lake User Group (SLUG)
- 👥 Utah Valley GIS (UVGIS)
- 👥 Northern Utah GIS (NUGIS)
- 👥 The Spatial Community Slack channel

ANNUAL UTAH GIS EVENTS

- 📅 UGIC Annual Conference (Typically held in April or May each year)
- 📅 Maps On The Hill (Held during each Utah General Session at the Utah State Capitol Rotunda)
- 📅 Esri User Conference (Typically held in July each year)

TRAINING

Online Esri Training

Esri has many online courses that are included in the annual software maintenance cost. They also have several basic free courses that are a good introduction to GIS and ArcMap/ArcGIS Pro.

Free Esri Courses

- 📍 Intro to GIS
  - ◉ GIS Basics (ArcGIS Pro)
  - ◉ Getting Started with GIS (ArcMap)
- 📍 Getting Started with ArcGIS Pro (Intro ArcGIS Pro)
- 📍 Cartography MOOC (This is a great introduction to cartographic design principles and applications.)
- 📍 AGOL Fundamentals (This includes short intro videos; one intro course; and several advanced, maintenance-required courses.)

AGOL Basics and Essentials

- 📍 Esri's getting started page
- 📍 *Credit usage by capability
  - ◉ Credits can be purchased in blocks of 1,000, usually for $100 (i.e., 10 cents/credit).
- 📍 AGOL subscription types and pricing
- 📍 AGOL user account control: types, roles, and privileges

QGIS Training

- 📍 A Gentle Introduction to GIS
- 📍 QGIS Training Manual
- 📍 https://www.qgistutorials.com/en/: Step-by-step guides for common QGIS tasks
- 📍 Baruch College's Introduction to GIS Using Open Source Software
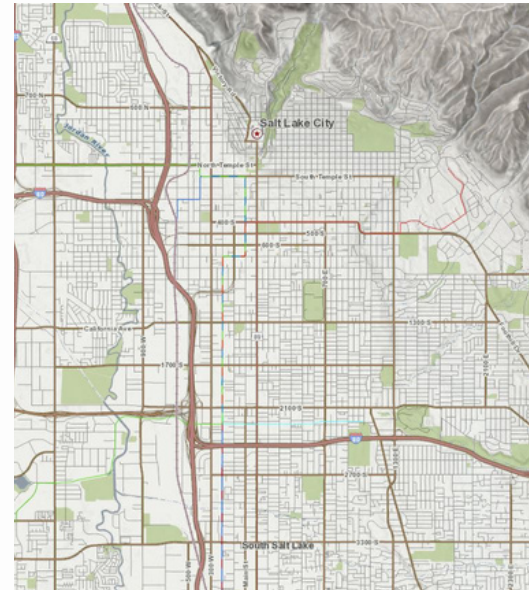
*A Note on Figuring Out AGOL Credits

(This is a quick summary of how AGRC understands AGOL credit accounting. For the official Esri position, check out Esri's Understand credits page: https://doc.arcgis.com/en/arcgis-online/administer/credits.htm.)

Esri gives credit costs per month and billing is calculated each hour. For example, a 10 MB hosted feature service that was hosted for one month would use 2.4 credits. That same dataset hosted for an hour would be 2.4 / 30 / 24 = 0.00333 credits and hosted for one year would be 28.8 credits.

Tile layers (and other nonfeature storage categories) are currently significantly cheaper (1/200th) than hosted feature layers—1.2 credits per 1 GB vs 2.4 credits per 10 MB.

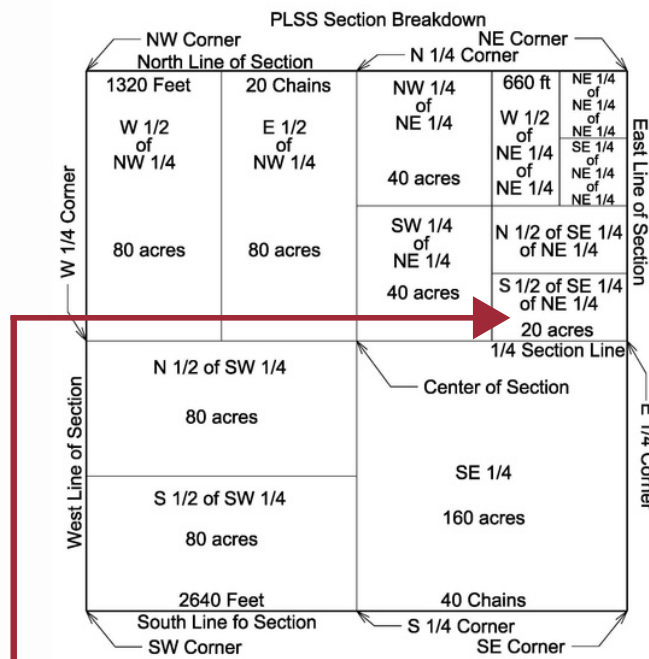All your credits sit in a common pool regardless of where they come from. You'll get a certain number of credits from different sources—various AGOL subscription levels, Business Analyst, or purchasing them outright. Some of these have different expiration dates, and right now there's no good way in AGOL to tell how many will expire when. Good accounting is your only tool.

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PUBLIC LAND SURVEY SYSTEM AT A GLANCE

PLSS Section Breakdown

NW Corner — North Line of Section — NE Corner — N 1/4 Corner — NE 1/4 Corner

1320 Feet	20 Chains	NW 1/4 of NE 1/4	660 ft	NE 1/4 of NE 1/4
W 1/2 of NW 1/4	E 1/2 of NW 1/4	40 acres	W 1/2 of NE 1/4 of NE 1/4	SE 1/4 of NE 1/4 of NE 1/4
80 acres	80 acres	SW 1/4 of NE 1/4 — 40 acres	N 1/2 of SE 1/4 of NE 1/4	
			S 1/2 of SE 1/4 of NE 1/4 — 20 acres	

W 1/4 Corner · W 1/2 Corner · West Line of Section · East Line of Section · E 1/4 Corner

1/4 Section Line — Center of Section

N 1/2 of SW 1/4 — 80 acres

SE 1/4 — 160 acres

S 1/2 of SW 1/4 — 80 acres

2640 Feet — South Line fo Section — SW Corner — S 1/4 Corner — 40 Chains — SE Corner

Example Description: *A parcel of land situated in the south half of the southeast quarter of the northeast quarter of Section 31, Township 2 South, Range 2 West, Salt Lake Base and Meridian.*

Section Numbers in Township with Adjacent Sections

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

Township and Range

T2N R2W	T2N R1W	T2N R1E	T2N R2E
T1N R2W	T1N R1W	T1N R1E	T1N R2E
T1S R2W	T1S R1W	T1S R1E	T1S R2E
T2S R2W	T2S R1W	T2S R1E	T2S R2E

Prime Meridian · Base Line · Range Line · Township Line

DISTANCE CONVERSIONS

1 Mile
= 80 chains
= 320 rods
= 320 perches
= 320 poles
= 5,280 feet
= 8,000 links
= 1,609.2655 meters

1 Chain
= 4 rods
= 4 perches
= 4 poles
= 66 feet
= 100 links
= 20.1168 meters

1 Inch
= 0.0254 meters

1 Link
= 0.66 feet
= 7.92 inches
= 0.2017 meters

1 Meter
= 39.370 inches
= 3.281 feet

1 Rod = 16.5 feet

1 Perch = 25 links

1 Pole = 5.0292 meters

1 Foot
= 0.3048 meters

GEOGRAPHIC COORDINATE DATABASE (GCDB) POINT IDs

XxxYyy, where Xxx = the following range of values

711 - 719   Town Sites, City Boundaries
720 - 739   County Boundaries
740 - 769   State Boundaries
770 - 799   Forest Service, Parks Service, Reservations, Grant, Other Boundaries with Mileposts
800 - 836   Meanders (right bank even #, left bank odd #)
837 - 879   Tracts
880 - 899   Right of Ways
900 - 999   Mineral Surveys, Homestead Entries, etc.
Yyy - Numbered sequentially along the survey in increments of 10. The prefix Xxx - may be the same for all points in a similar survey.

Irregularities of Townships for ones places of Xxx and Yyy.

1, 2, 8 or 9 -> offset corners along interior section lines and section subdivision lines where +/- 2 is the recommended naming scheme and THE GRAPHICS RULE MUST BE FOLLOWED.

3 or 7 -> offset corners along township boundaries, angle points, witness corners, and witness points.

4 or 6 -> intersections of rectangular/special surveys and 1/16th corners of elongated sections.

0 -> all regular aliquot corners down to 1/16th.
5 -> all regular aliquot corners down to 1/256th.

AREA CONVERSIONS

1 Square Mile
= Nominal Section
= 640 acres
= 2.590 sq. km.
= 259 hectares

1 Acre
= 10 sq. chains
= 160 sq. rods
= 160 perches
= 160 poles
= 43,560 sq. feet
= 0.4047 hectare
= 4,047 sq. meters

1 Hectare
= 2.47 acres

1 Sq. Meter
= 10.764 sq. ft.

TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

(Column labels: 100700, 200700, 300700, 400700, 500700, 600700, 700700; Row labels down left and right: 100600/700600, 100500/700500, 100400/700400, 100300/700300, 100200/700200, 100100/700100)

SECTION 31

F	E	B	A
G	H	C	D
J	I	N	M
K	L	O	P

(Column labels: 100200, 120200, 140200, 160200, 200200; Row labels: 100160/200160, 100140/200140, 100120/200120, 100100/200100)

SW 1/4 OF SW 1/4 OF SECTION 31

	K		

(Column labels: 100120, 105120, 110120, 115120, 120120; Row labels: 100115/120115, 100110/120110, 100105/120105, 100100/120100)

Bureau of Land Management (BLM) Point IDs

State — Township — Range — Township duplicate (0, A or B)

UT260060S0020E0_240400

Principal Meridian — GCDB Point ID

Township and Range
(5 characters each)

3 digits for Township or Range number
1 digit for fraction (0 for no fraction, 1 for 1/4 township, 2 for 1/2 township, 3 for 3/4 township)
1 letter for direction