



INDIANA GEOGRAPHIC
INFORMATION OFFICE

Indiana Imagery & Elevation 2025-2028 Program

Indiana Geographic Information Office

Enterprise and Infrastructure

Programs and Outreach



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GIS



**INDIANA GEOGRAPHIC
INFORMATION OFFICE**

IndianaMap

Place for Indiana Geospatial Information
Welcome to the new site!

Find information using categories like "boundaries" or "transportation".

ing a collection of authoritative data and web services. It is an organization
, private sector and academia. Search for or browse the data, use
ps.

GIS Community by the [Indiana Geographic Information Office](#)
cil (IGIC).



INDIANAMAP

- Open Data
- Over 450 maps
- Collaboration with state agencies and other partners
- Access to Free AGOL Community Accounts

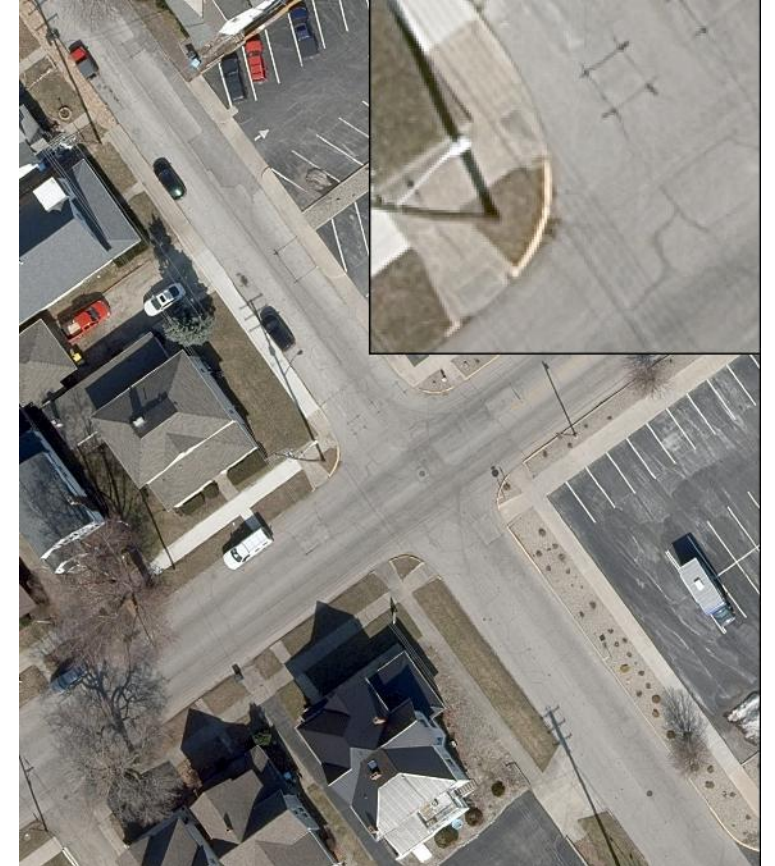
Why Statewide Imagery



Google Imagery
Can you see the
house?



2022 State Imagery
6-inch resolution



2024 State Imagery
3-inch resolution

Advantages of Statewide Program

- Authoritative
- Collective Buying Power
- Procurement and Management
- Quality Assurance/Quality Control (QA/QC)
- Reliable schedule
- Available at no cost





Indiana Program History

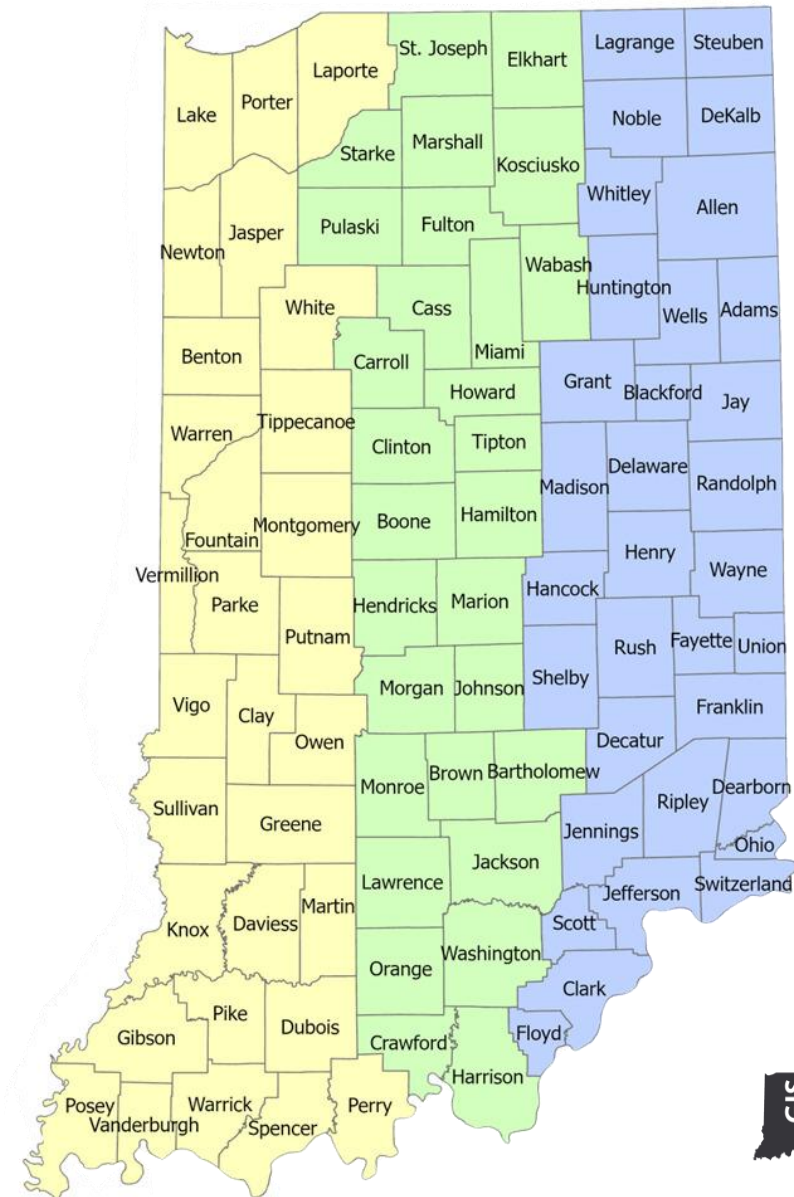
Orthoimagery

- 2005-2006
- 2011-2015
- 2016-2019
- 2021-2024
- 2025-2028

Lidar

- 2011-2013
- 2016-2019
- 2025-2028

-  Tier 1 (2025 Imagery only)
-  Tier 1 (2026 Imagery & Lidar)
-  Tier 2 (2027 Imagery & Lidar)
-  Tier 3 (2028 Imagery & Lidar)



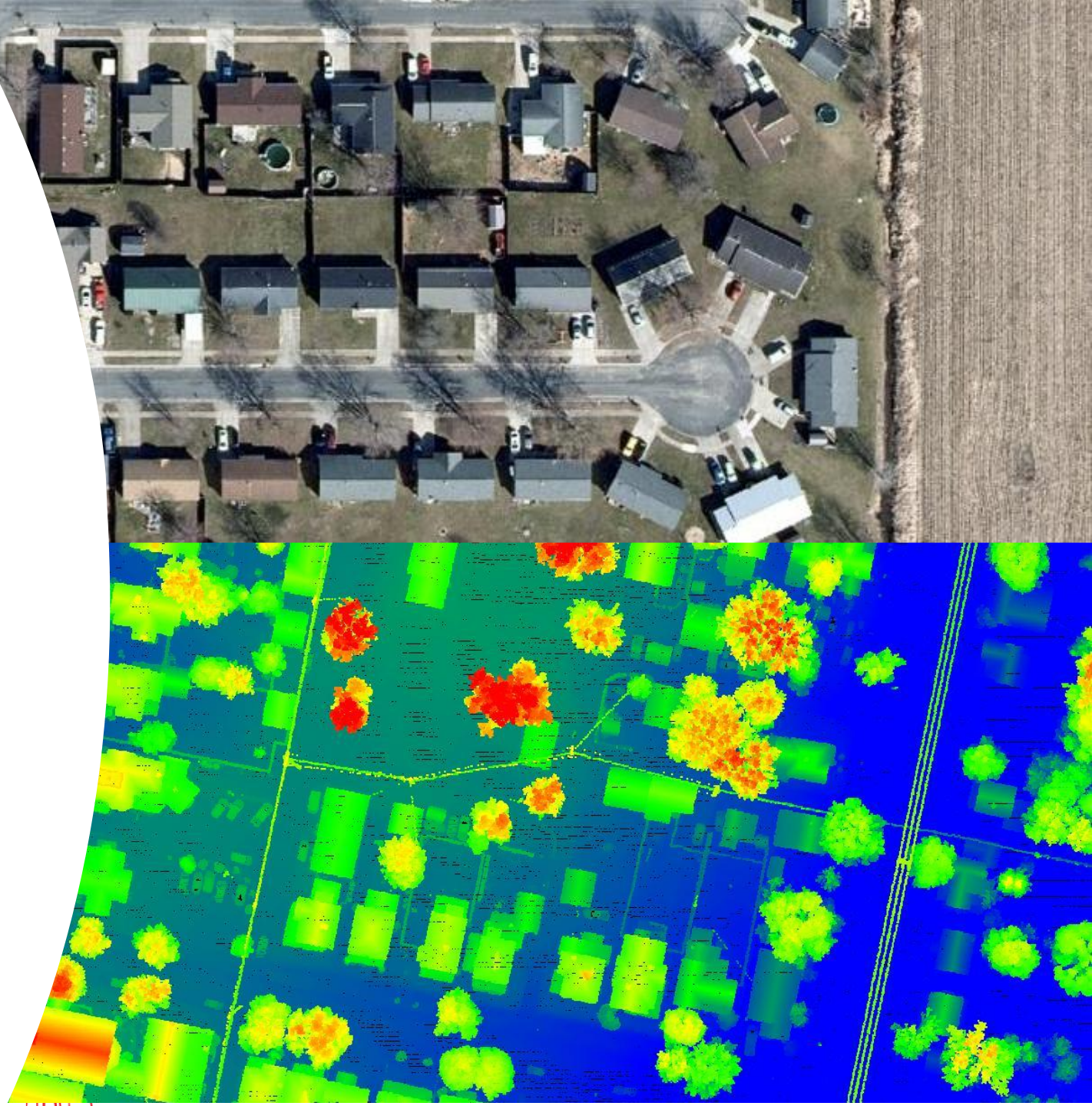
Program Specs 2025 - 2028

- **Orthoimagery Base Products**

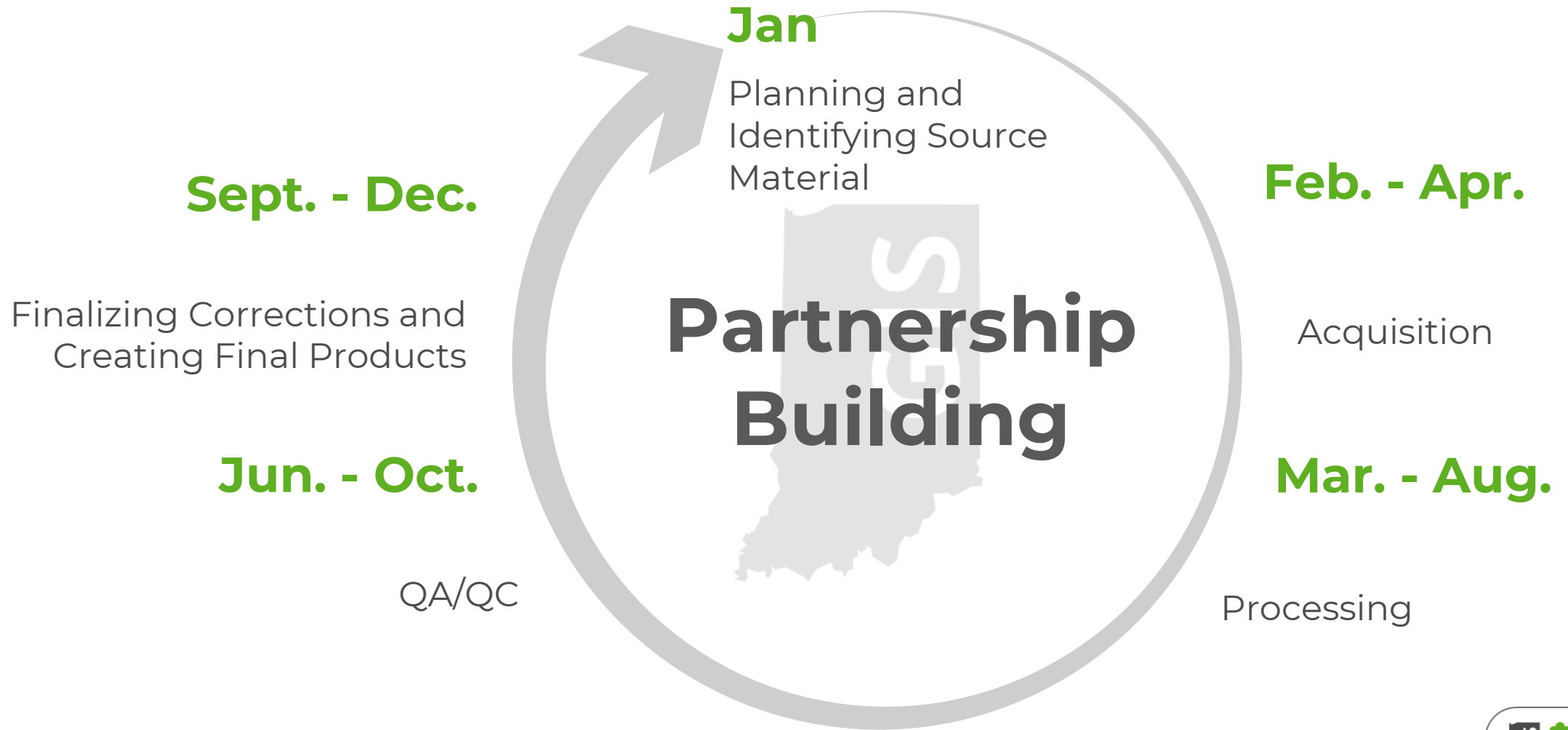
- Leaf-off
- 3-inch (7.5-cm) pixel resolution
- 4 -Band (R,G,B, NIR) imagery

- **Lidar Base Products**

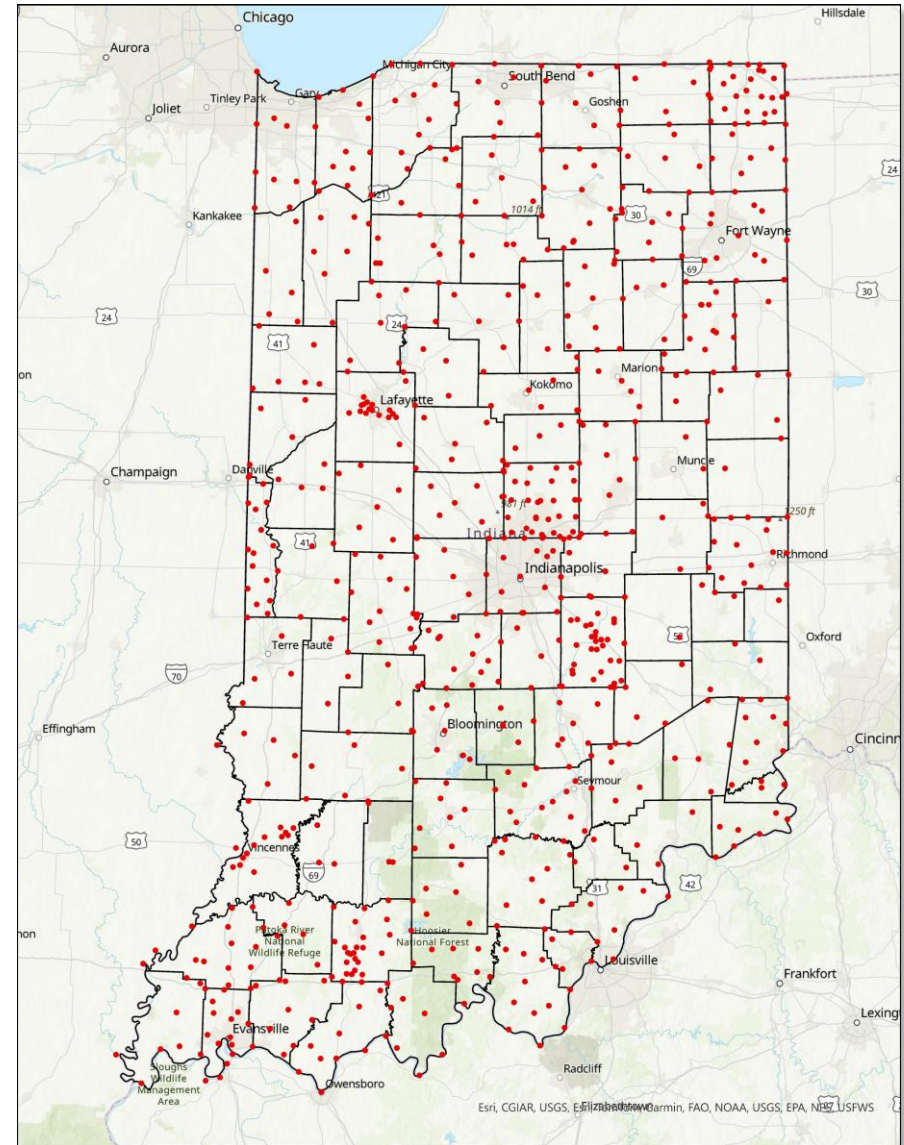
- QL1, 10 cm vertical accuracy with a point density of 8 ppsm



Program Timeline



Ground Control



INDOT Review

Orthoimagery

- Review seam lines
- Bridge decks
- Tonal balance
- Overall image quality

Lidar

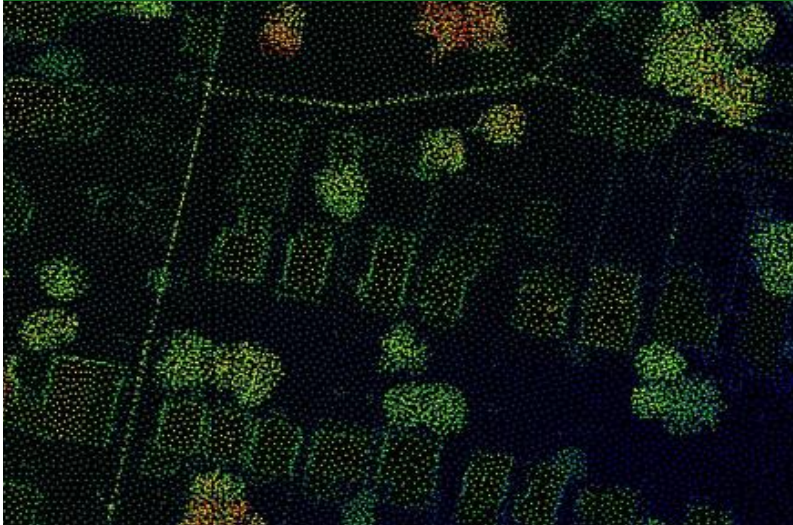
- Bare Earth Digital Elevation Model (DEM)
- Digital Surface Model (DSM)



Indiana Lidar Collects?

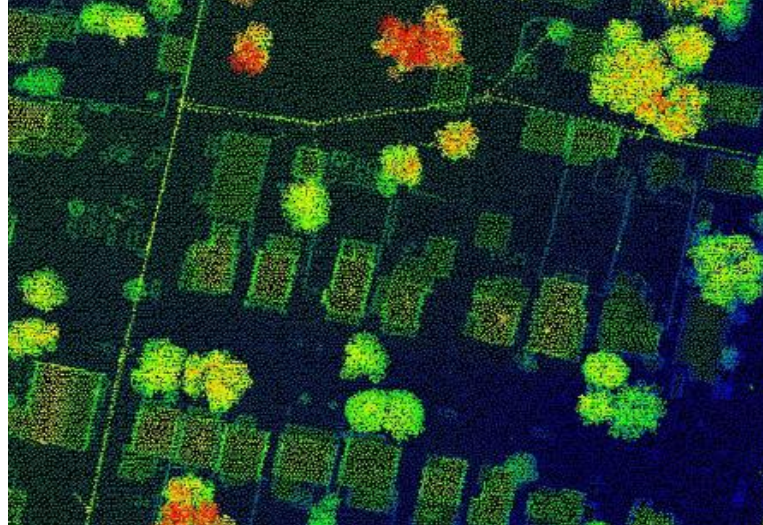
2011-2013

QL3 Lidar (.5 ppsm)



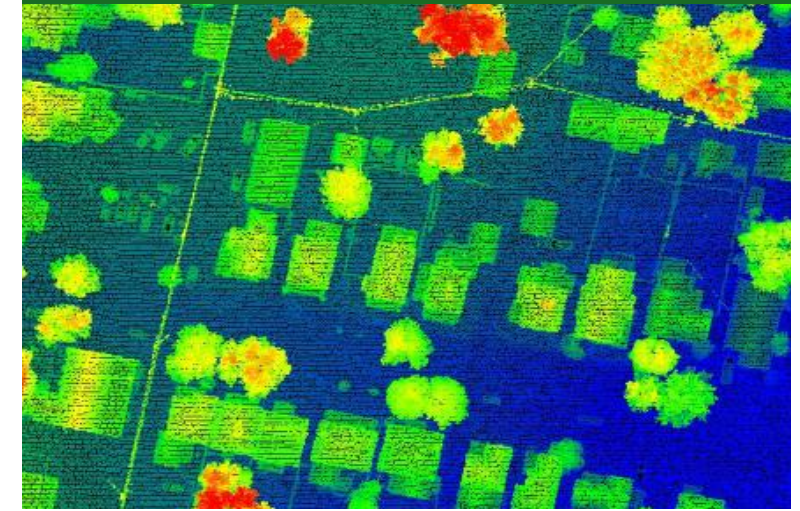
2016-2020

QL2 Lidar (2 ppsm)

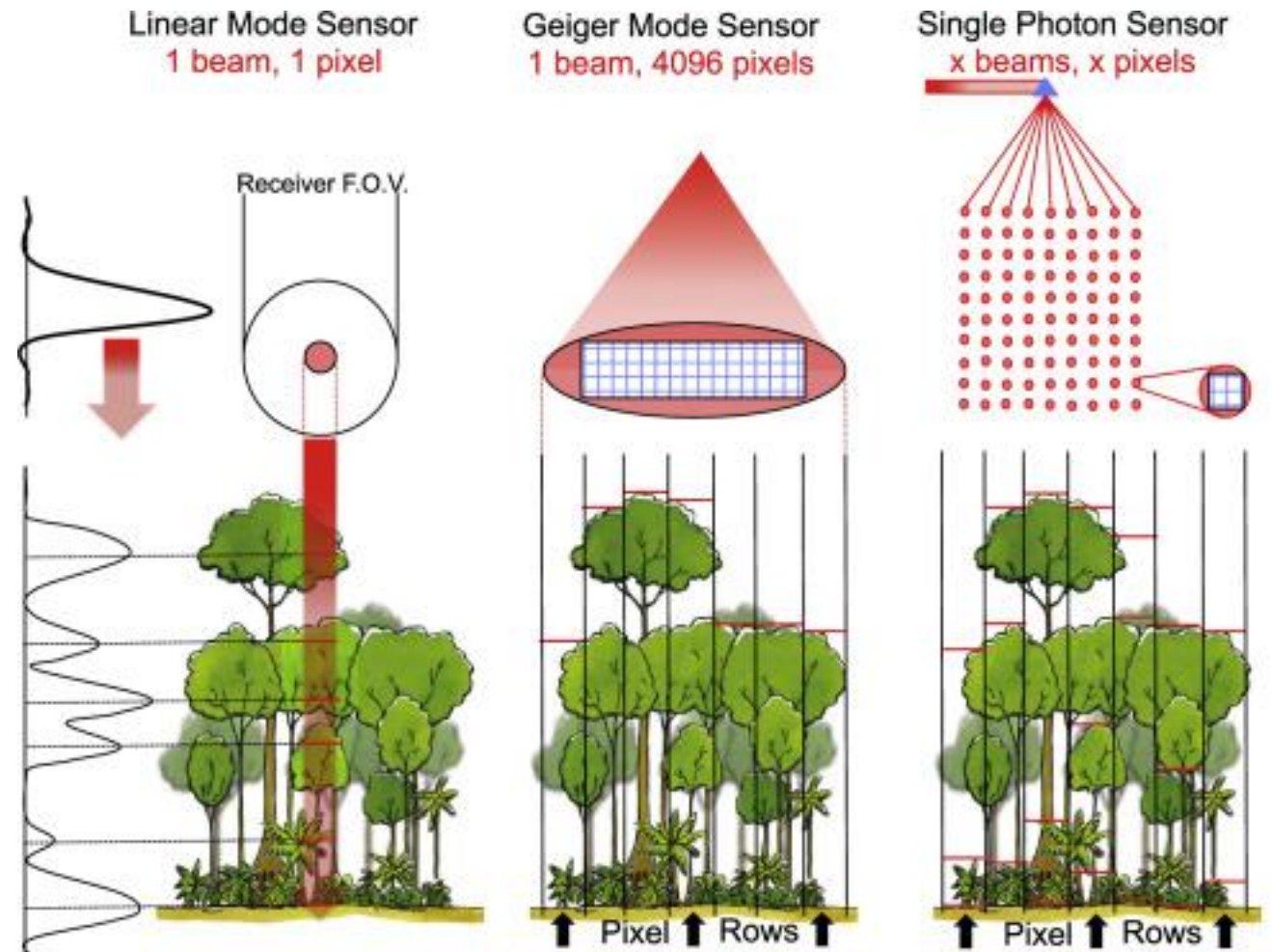


2026-2028

QL1 Lidar (8 ppsm)

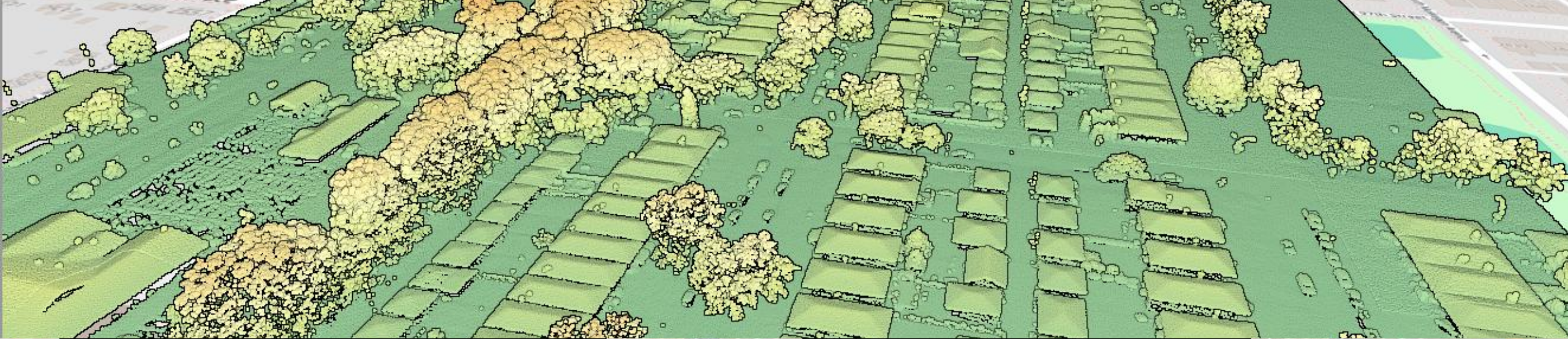


Lidar Technologies



USGS Quality Level (QL)

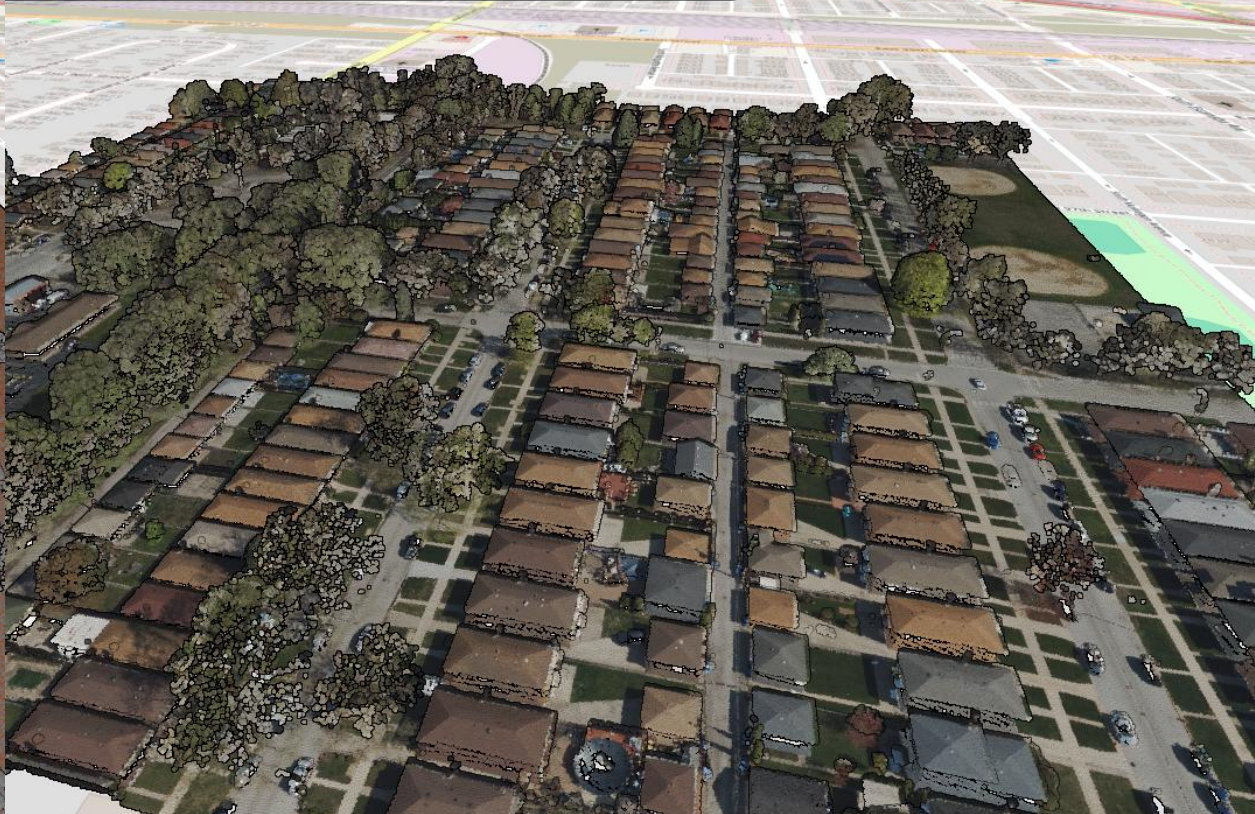
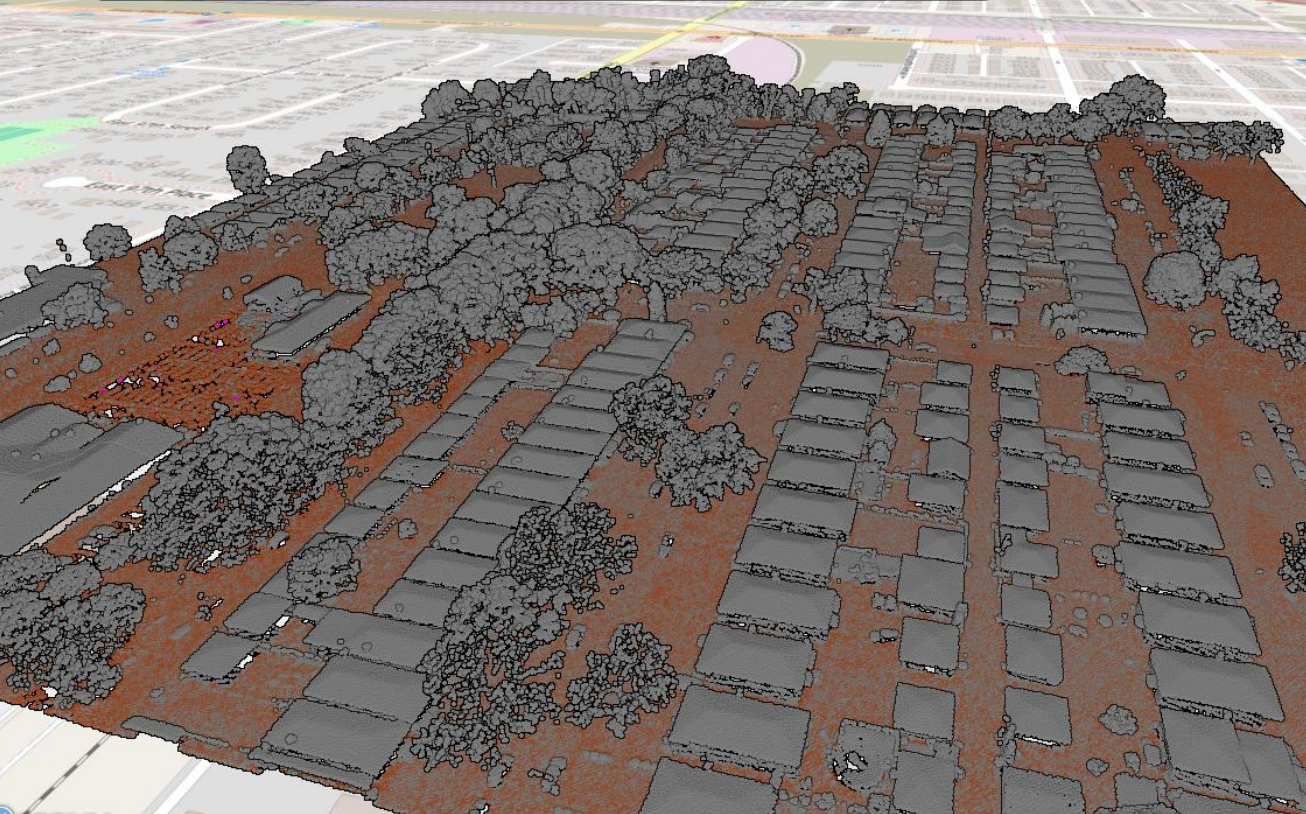
- Resolution – Point Density
- Accuracy – Vertical Accuracy
- Base Classification
 - Bare Earth (Class 2) – Ground points used for terrain modeling.
 - Water (Class 9) – Points representing water surfaces.
 - Bridge Deck (Class 17) – Points classified as bridge structures.
- Optional Classification
 - Building (Class 6) – Points classified as man-made structures
 - Vegetation (Class 3, 4, & 5) – Points representing low medium, and high



Attribute Gradient Measure Material Point budget: 2.0M
classification

Gradient Measure Material Point budget: 2.0M
elevation

New File



Lidar - Derived Products

Digital Elevation Model (DEM)



Hillshade



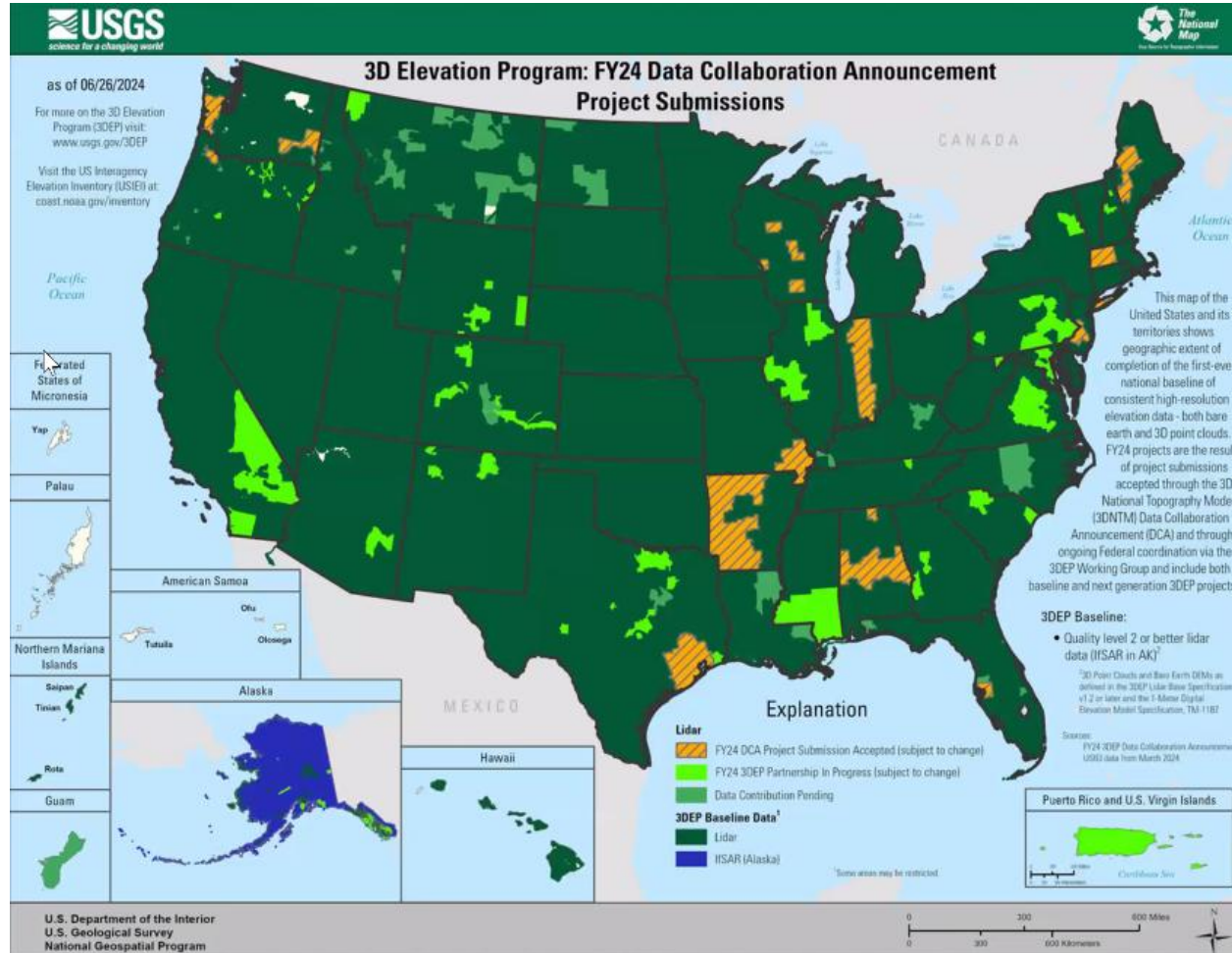
Digital Surface Model (DSM)



Contours



USGS 3DEP Program

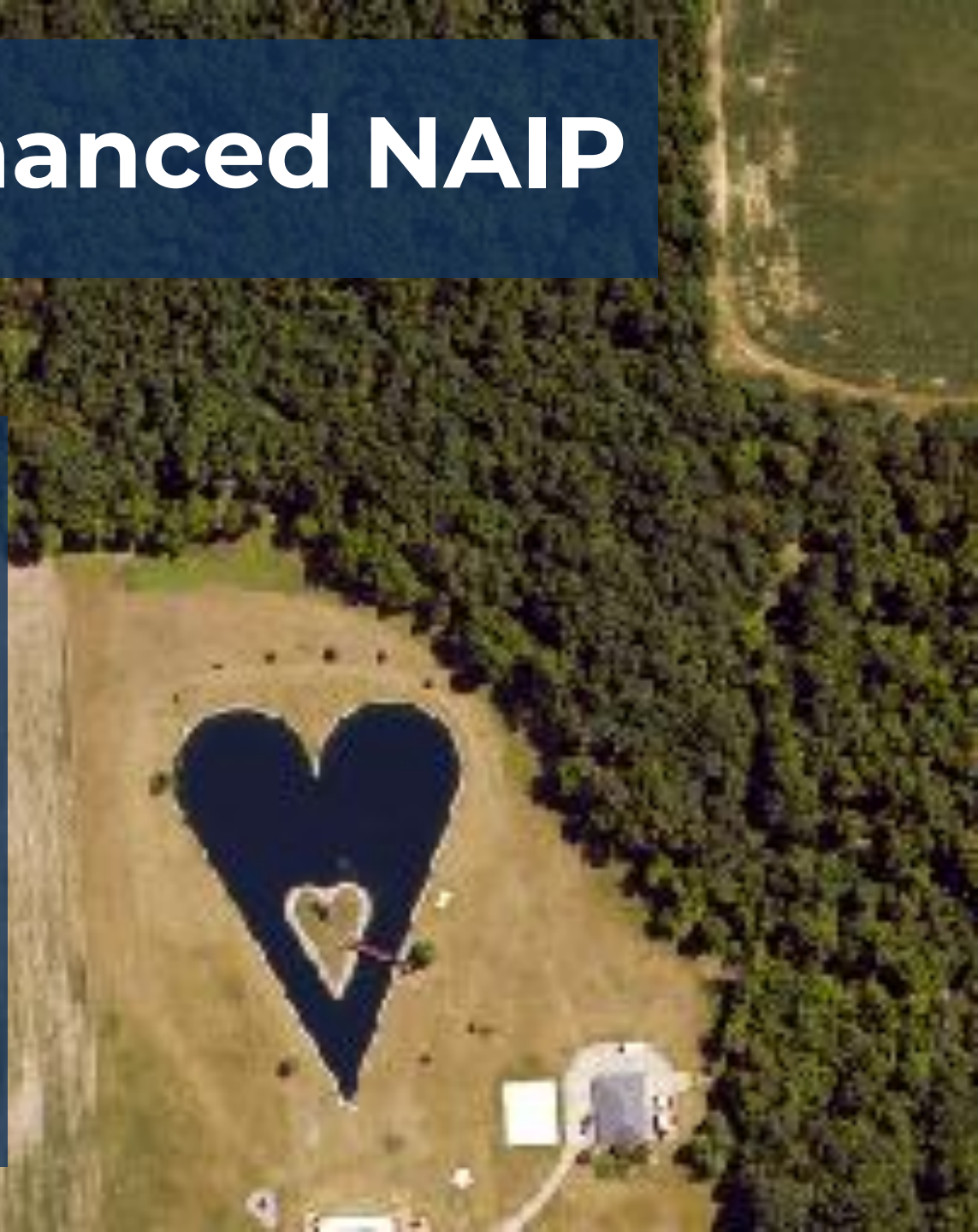


- Cooperative Agreement
- National Dataset

Indiana 2025 Enhanced NAIP

Captured during the summer of 2025

- **Resolution to 6 inch**
- **Accuracy to 2 pixels (1 ft)**
- **Available early 2026**
- **Digital Surface Model (DSM)**
- **Deliverables: Geotiff, COG, jpgs / (MrSIDs)**



Delivery



Amazon
S3



Accessibility

Image services

Open Data

Download

No Cost for the Public

Web Map Applications

IndianaMap.org



➤ Accessing and using imagery

All imagery, elevation, and open datasets:

- Not tied to specific software
- Free to use without extra restrictions
- Accessible through many endpoints
- The IGIO can provide support and advice for how to access and use GIS data in business processes



Free & low cost options

ESRI ecosystem

- Portal viewer account (gisdata.in.gov)

Open-source software

- QGIS (approved software)
- Python, R, other programming languages

➤ Case 1: QGIS

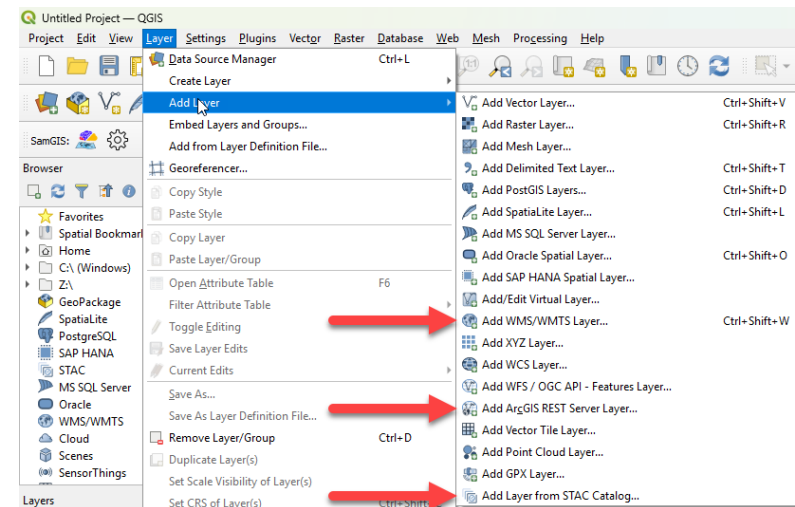
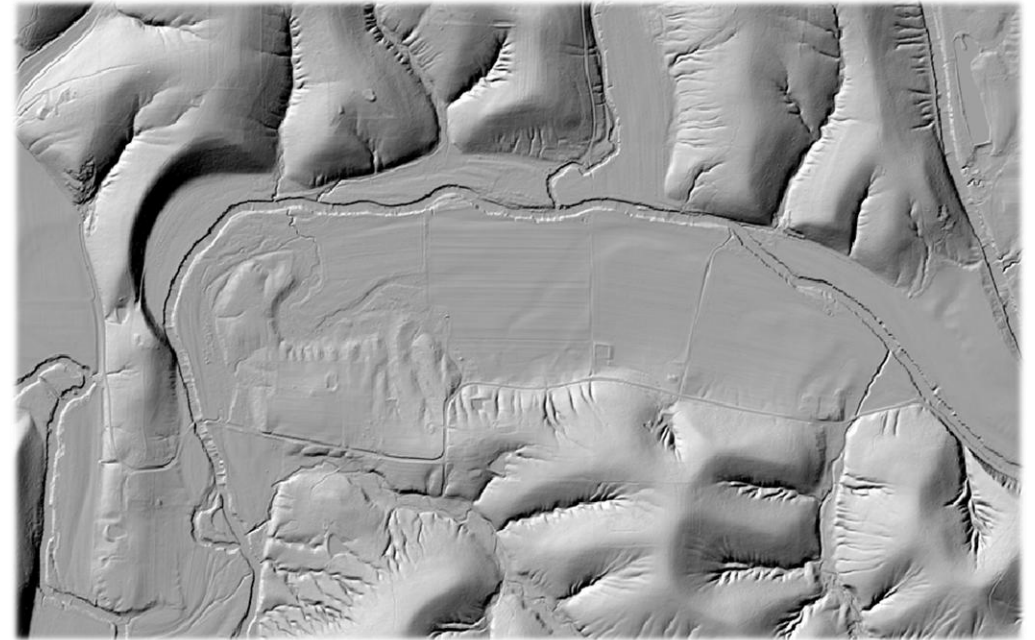
- Similar interface to ArcGIS Pro
- Based on the open source GDAL ecosystem
- Highly extensible with open-source addons
- Approved software at the State of Indiana

➤ Add from server

- Layer -> Add Layer
 - WMS
 - ArcGIS Layer
 - STAC

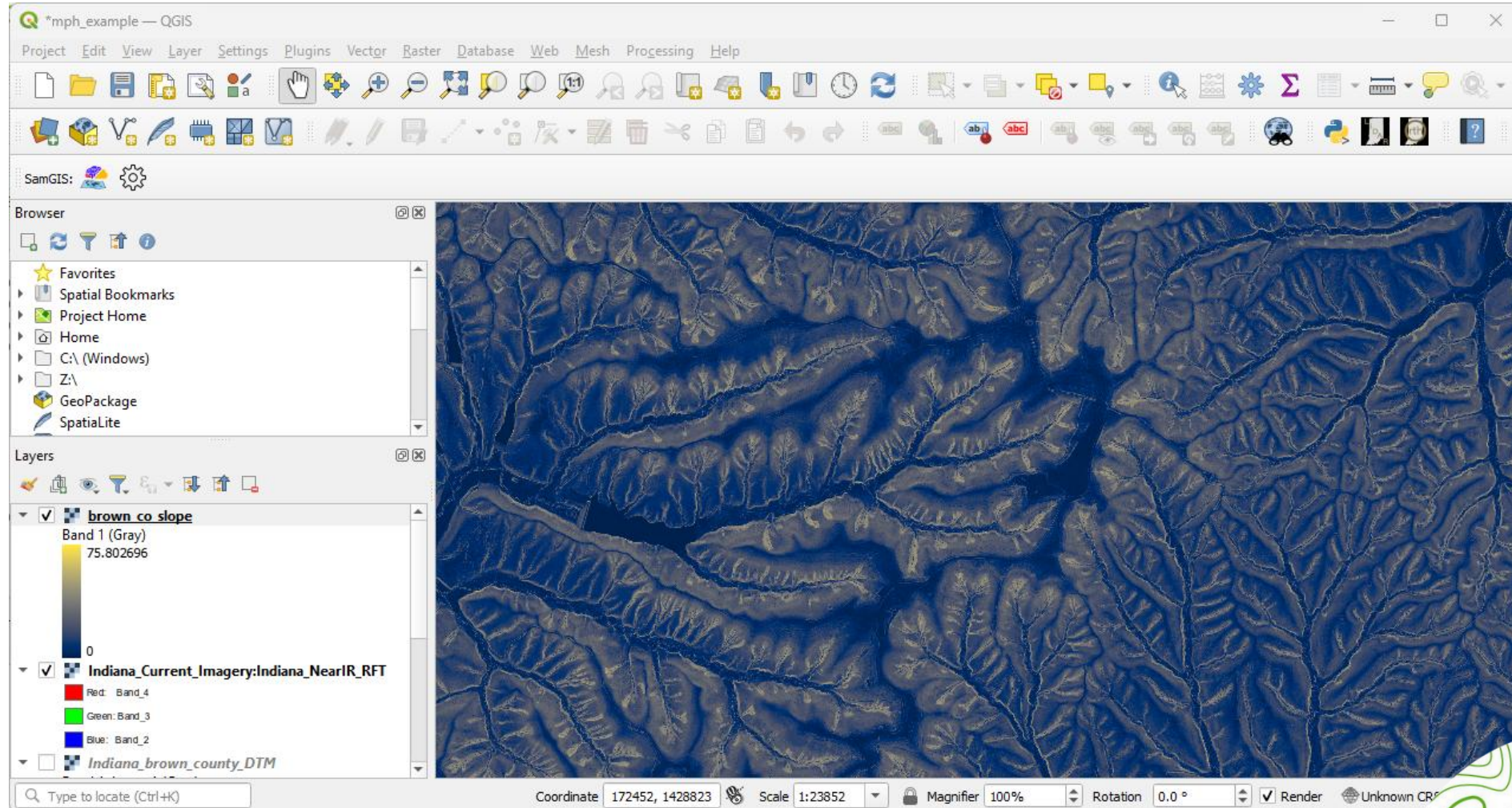
➤ Purdue Addon

- Install through built-in addon store
- Stream data on a county level





Case 1: QGIS



➤ Case 2: At risk parcels in Spencer IN



Herald Times, 4/7/2025



Herald Times, Kriste Lindbergh, 4/8/2025

➤ Case 2: Add imagery to plots in R

- R-ArcGIS bridge provides a simple API for accessing the IGIO's open data
- Automatically loads feature services and images as sf and terra objects
- Similar APIs available for other languages like python, javascript, rust, etc.



➤ Install arcgis library

```
# Install arcgis bridge library  
install.packages("arcgis", repos = c("https://r-arcgis.r-universe.dev", "https://cloud.r-project.org"))  
  
# Load library in project  
library(arcgis)
```

Case 2: Gather data

 Dataset

Best Available Flood Hazard Current

IndianaMap

Best available flood hazard data for Indiana. It includes effective mapping with additional updates based on the Zone A mapping project data, DNR model reviews, and other floodplain data that is not FEMA approved.

Type: Feature Service Date updated: 7/17/2025

Tags: BAFL, Best Available Flood Hazard, Flood, Hazard, Floo... Categories: Environment, Inland waters

```
flood_url <- "https://gisdata.in.gov/server/rest/services/Host
19 flood_fs <- arc_open(flood_url)
20 flood_fields <- c("objectid", "fld_zone","zone_subty")
21
22 flood_sdf <- arc_select(flood_fs,
23   fields=flood_fields,
24   filter_geom=bbox,
25   spatialReference=3857)
26 flood_sdf$geometry <- st_transform(flood_sdf$geometry, 3857)
```

 Dataset

Parcel Boundaries of Indiana Current


Indiana Geographic Information Office (IGIO)

This dataset was developed to provide accurate parcel boundaries for Indiana, as part of Indiana's annual GIS Data harvest Data Sharing Initiative (IDSI) of the Indiana Geographic Information Office (IGIO).

Type: Feature Service Date updated: 2/24/2026

Tags: Parcel, Parcels, Cadastral, Cadastre Categories: Planning and cadastre

```
parcel_url <- "https://gisdata.in.gov/server/rest/services/Host
29 parcel_fs <- arc_open(parcel_url)
30 parcel_fields <- c("objectid", "state_parcel_id")
31
32 parcel_sdf <- arc_select(parcel_fs,
33   fields=parcel_fields,
34   filter_geom=bbox)
35 parcel_sdf$geometry <- st_transform(parcel_sdf$geometry, 3857)
36
```

 Dataset

Indiana 2023 Imagery

IndianaMap

This dataset contains tiles of orthoimagery collected for the Indiana Geographic Information Office in 2023.

Type: Image Service Date updated: 12/18/2024

Tags: Imagery, Orthoimagery, Natural Color, Color Infrared, ... Date created: 2/14/2024

```
img_url <- "https://di-ingov.img.arcgis.com/ar
58 img_fs <- arc_open(img_url)
59 base <- arc_raster(img_fs,
60   xmin = bbox[[1]],
61   ymin = bbox[[2]],
62   xmax = bbox[[3]],
63   ymax = bbox[[4]],
64   bbox_crs = 3857,
65   width = (bbox[[3]] - bbox[[1]]) / 2.2,
66   height = (bbox[[4]] - bbox[[2]]) / 2.2
67 )
```

➤ Case 2: Add imagery to plots in R

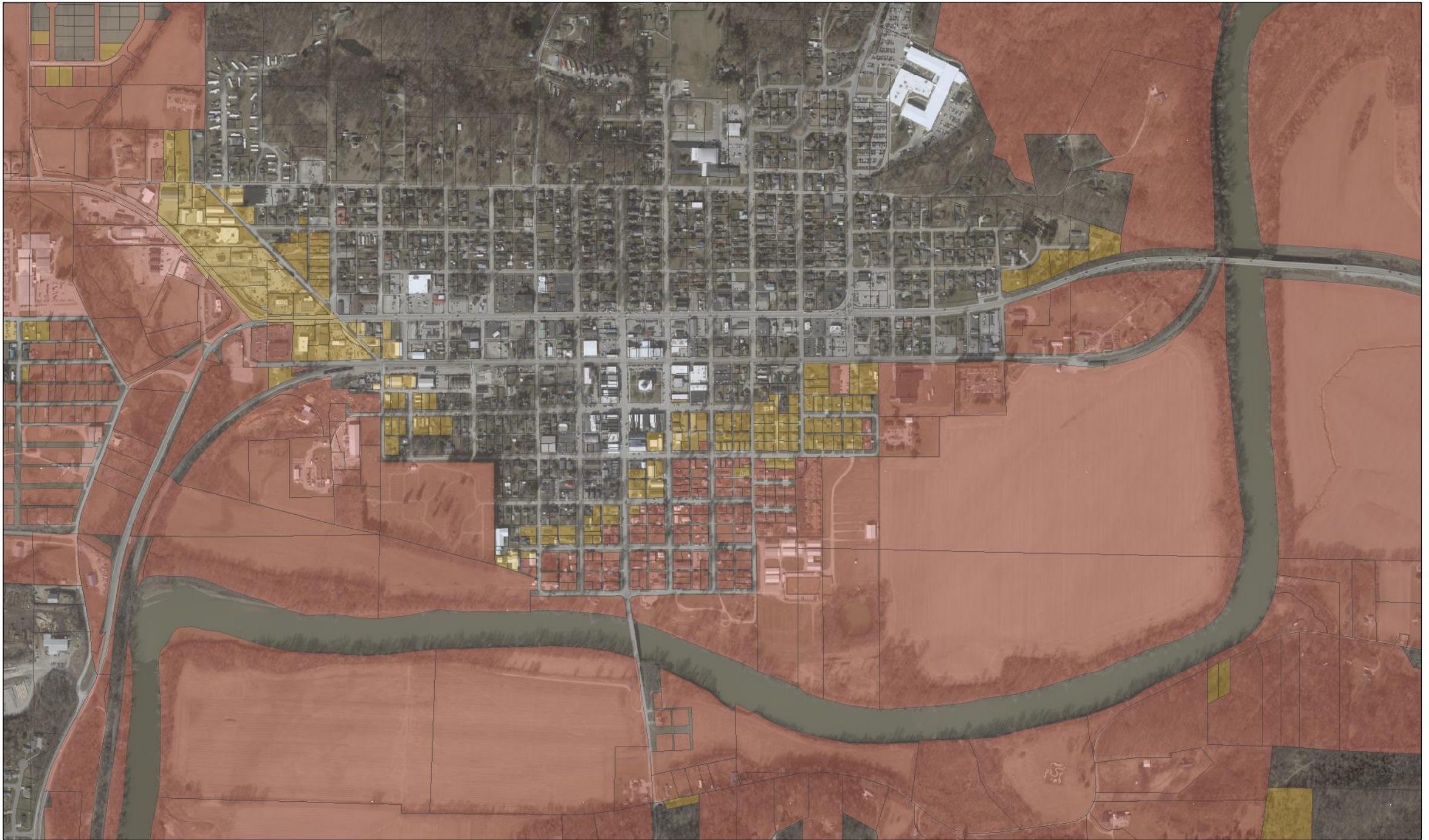
➤ Classify parcels by flood zone

```
38 attach(flood_sdf)
39 floodways <- flood_sdf[fld_zone == "A" | fld_zone == "AE",]
40 small_risk <- flood_sdf[zone_subty == "0.2 PCT ANNUAL CHANCE FLOOD HAZARD",]
41 min_risk <- flood_sdf[zone_subty == "AREA OF MINIMAL FLOOD HAZARD",]
42 detach()
43
44 parcel_sdf$risk[<- 0
45 idx <- st_intersects(parcel_sdf$geometry,st_combine(min_risk), sparse = FALSE)[TRUE,1]
46 parcel_sdf$risk[idx] <- 0
47
48 idx <- st_intersects(parcel_sdf$geometry,st_combine(small_risk), sparse = FALSE)[TRUE,1]
49 parcel_sdf$risk[idx] <- 1
50
51 idx <- st_intersects(parcel_sdf$geometry,st_combine(floodways), sparse = FALSE)[TRUE,1]
52 parcel_sdf$risk[idx] <- 2
53
```

➤ Set up plot

- tmap is a library that creates maps using similar syntax to ggplot

```
69 tmap_mode('plot')
70 map <- tm_shape(base) + tm_rgb(tm_vars(x = c('Band_1', 'Band_2', 'Band_3'), multivariate = TRUE))
71 map <- (map
72   + tm_shape(parcel_sdf[parcel_sdf$risk > 0,])
73   + tm_fill(fill = 'risk',
74     fill.scale = tm_scale_categorical(values = c("goldenrod1", "coral1")),
75     fill_alpha = 0.3)
76   + tm_borders(col_alpha=0.4)
77 )
78 map <- map + tm_shape(parcel_sdf[parcel_sdf$risk == 0,]) + tm_borders(col_alpha = 0.4)
79 map
```



risk

- 1
- 2



► Case 3: Analyze imagery in R

- terra objects let you apply operations to entire images in just a few lines of code
- R-ArcGIS Bridge pulls imagery information into terra objects for you
- Example:

```
img <- arc_raster( ... ) # open an image service with parameters like bounding box and
resolution

# Calculate NDVI
# Band 3 = red light, Band 4 = Near Infrared Light
ndvi <- (img$Band_4 - img$Band_3) / (img$Band_4 + img$Band_3)
```

Case 3: Sobel operator edge detection

- A simple algorithm for emphasizing edges in an image

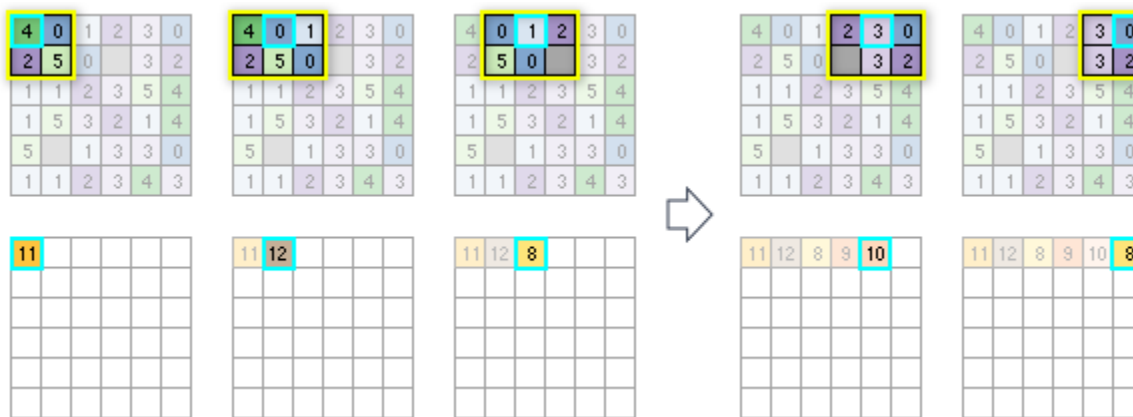


$$G_x = \begin{bmatrix} -1 & 0 & +1 \\ -2 & 0 & +2 \\ -1 & 0 & +1 \end{bmatrix} * A$$

$$G_y = \begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ +1 & +2 & +1 \end{bmatrix} * A$$

$$G = \sqrt{G_x^2 + G_y^2}$$

By Davidwkennedy - <http://en.wikipedia.org/wiki/File:Bikesgray.jpg>, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=8904801>



ESRI - <https://pro.arcgis.com/en/pro-app/latest/tool-reference/spatial-analyst/how-focal-statistics-works.htm>

➤ Case 3: Gather data

Dataset

Indiana 2023 Imagery

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Tags: Imagery, Orthoimagery, Natural Color, Color Infrared, ... Date created: 2/14/2024

```
24 img_url <- "https://di-ingov.img.arcgis.com/arcgis/rest/ser
25 img_fs <- arc_open(img_url)
26 base <- arc_raster(img_fs,
27                     xmin = bbox[[1]],
28                     ymin = bbox[[2]],
29                     xmax = bbox[[3]],
30                     ymax = bbox[[4]],
31                     bbox_crs = 3857,
32                     width = (bbox[[3]] - bbox[[1]]) / 0.2,
33                     height = (bbox[[4]] - bbox[[2]]) / 0.2
34 )
35 base
```

➤ Case 3: Apply algorithm

➤ Define operator

```
38 # sobel operator weights
39 vertical <- matrix(data = c(-1, 0, 1, -2, 0, 2, -1, 0, 1), 3, 3)
40 horizontal <- matrix(data = c(-1, -2, -1, 0, 0, 0, 1, 2, 1), 3, 3)
41
42 sobel <- function(band) {
43   b_h <- focal(band, w=vertical)
44   b_v <- focal(band, w=horizontal)
45   result <- sqrt(b_h**2 + b_v**2) #combine directions
46   result
47 }
48
49
50 avg <- mean(base) # 4 band grayscale
51 sb = sobel(avg$mean)
52
```

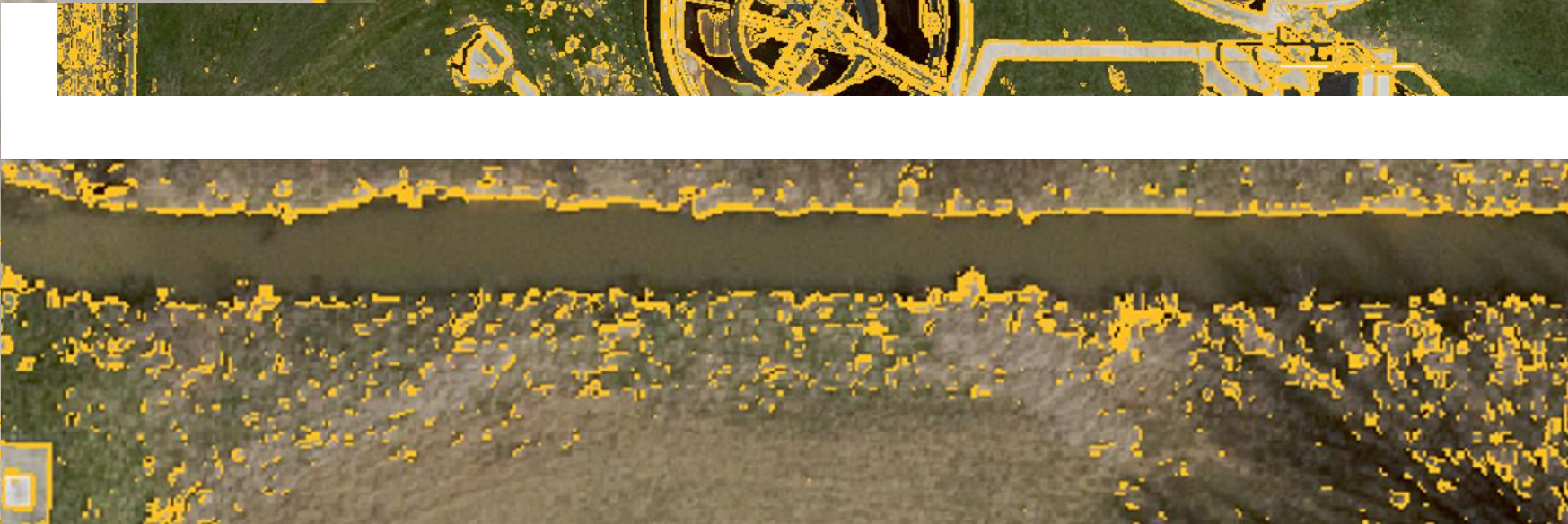
➤ Process and apply

➤ Create plot

```
60 tmap_mode('plot')
61 map <- (tm_shape(base)
62   + tm_rgb(
63     col = tm_vars(x = c('Band_1', 'Band_2', 'Band_3'),
64     multivariate = TRUE)
65   )
66 )
67 map <- map + tm_shape(mask(sb > 150, sb > 150)) + tm_raster(col = 'focal_sum',
68   col.scale=tm_scale_categorical(values = c(rgb(0,0,0, alpha = 0), "goldenrod")))
69 map
```



focal_sum
FALSE
TRUE





➤ **Case 3: Interactive**



circle-edge-highlight.html

Resources

Imagery Resource Page:

<https://imagery.gio.in.gov/>

(Note: this site has links to the Imagery REST services, Photo Centers, and Tile Footprints)

Elevation Resource Page:

<https://elevation.gio.in.gov/>

Orthoimagery and Elevation DEM REST services:

<https://di-ingov.img.arcgis.com/arcgis/rest/services/>

Indiana Imagery Photo Centers | IndianaMap:

<https://www.indianamap.org/maps/b462ca68cae14904a524754b36ea2540/about>

Indiana Imagery Tile Footprints: | IndianaMap:

<https://indianamap-inmap.hub.arcgis.com/maps/548c94928bd64ac2a7f1ba94d6b4e7f4/about>

IndianaMap:

<https://www.indianamap.org/>

Code snippets and examples:

<https://github.com/indiana-gio/imagery-access-snippets>

STAY IN TOUCH

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The IGIO’s monthly newsletter



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with our office

