

Waikato Regional Council Spatial Information Section

to the NZEUC, Auckland, August 2018






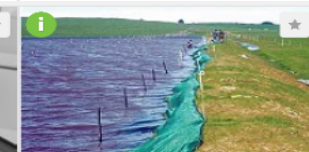



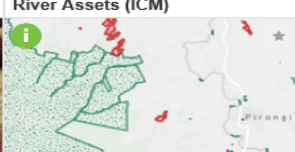
A year on since adopting ArcGIS ...
... what benefits have we realised?

Improved web maps

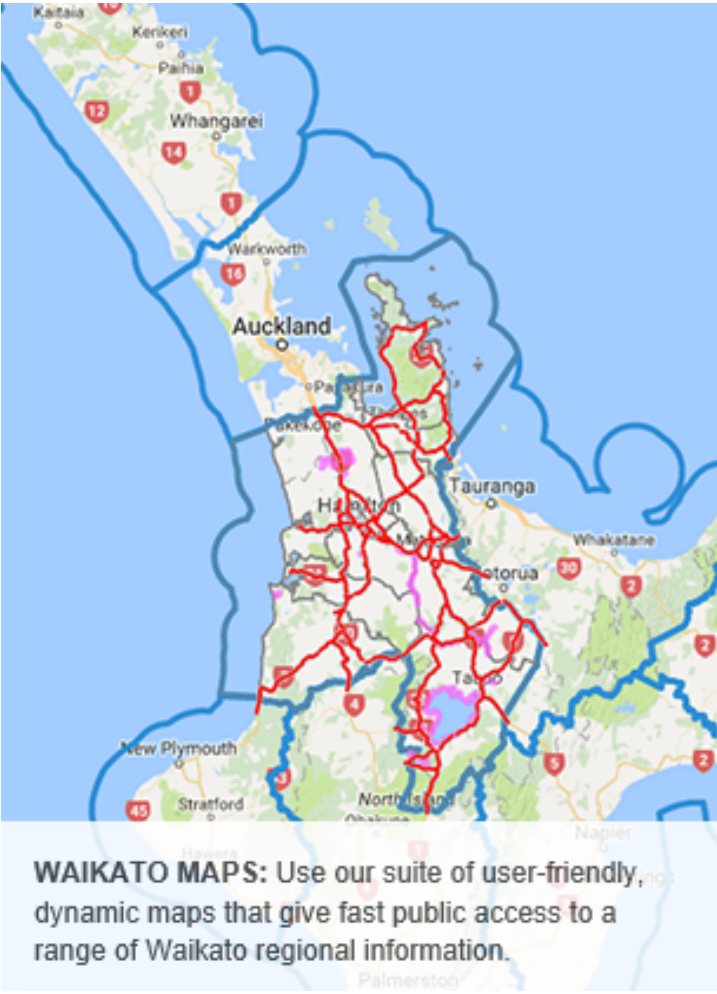
Maps for staff...



ourmaps
Ā Tātou Mapi

 Archaeology (SAS)	 Biosecurity (ICM)	 Contours (SAS)	 Customer Services (SAS)
 CMO Assets (ICM)	 Community Biodiversity Projects (ICM)	 Find It (SAS)	 Customer Services (SAS)
 Dam Register (RUD)	 Drainage Assets (ICM)	 Find It (SAS)	 Flood Hazards (ICM)
 Healthy Rivers/Wai Ora (ICM)	 Lake Taupo (RUD)	 Land Resource Inventory (SAS)	 Marine Farms (RUD)
 Monitoring (RUD)	 Monitoring (SAS)	 Moorings (RUD)	 OSH Call In (SAS)
 Oblique Photos (ICM)	 River Assets (ICM)	 SLUS (SAS)	 Soil Risk for FDE (RUD)
 Tai Ranga Whenua (ICM)	 The SNA, Terrestrial Biodiversity (ICM)	 Water Allocation (RUD)	

Maps and tools for the public...



WAIKATO MAPS: Use our suite of user-friendly, dynamic maps that give fast public access to a range of Waikato regional information.

<https://www.waikatoregion.govt.nz/services/maps/>

Improved web maps



Catchment Management Zones
The zones used by Waikato Regional Council to manage the region's catchments.



Consents and Permits
The location and details of active consents and permits.



Contours
Contour map contains both topographic contours and WRC LiDAR contour data. Contours are aggregated into 1m, 5m, 10m, 20m and 100m interval level



Drainage
Drainage supervisor and drain information



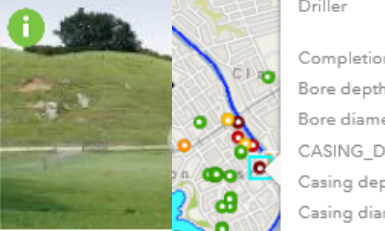
Groundwater
Groundwater map shows the location and number of groundwater wells in the Waikato region and related lithology information of each wells.



Iwi Information
Iwi acknowledgement areas in the Waikato Region.



Regional Map
Generic Map for the Waikato Region



Soil Risk for Fertiliser
This map shows the risk of applying Farm Decision Support System (FDSS) soil.



Variation 5 Taupo
Lake Taupo catchment boundary and near shore zone boundary as used for the Waikato Regional Plan Variation 5 – Lake Taupo Catchment.



Vegetation Biodiversity
A range of biodiversity information including land cover, biodiversity vegetation, bioclimatic zones, soil group classification and soil drainage.



Water Classification
This map displays river boundary areas in the coastal regions and the classification of water bodies as set by the Waikato Regional Plan.

Groundwater

Search Address, Bore Location

(2 of 3)

Well No.: 62_80

Driller	Benton & Son Ltd
Completion date	2/9/1982
Bore depth (m)	108.00
Bore diameter (mm)	76
CASING_DEPTH_M	89.80
Casing depth (m)	
Casing diameter (mm)	
Screen depth from (m)	
CONSTRUCTION_MATERIAL	
Slot size (mm)	
Observed water quality	Unknown
Strat log quality	

BoreLogs

WELL NO.	START DEPTH	END DEPTH
62_80	0m	3.35m
	3.35m	3.66m
	3.66m	6.41m
	6.41m	10.67m

Map controls: Pan to, Add a marker, Show Groundwater Log, More Info

<https://www.waikatoregion.govt.nz/services/maps/>

Mobile technology

- Survey123 & ArcCollector
- User-driven data capture forms
- User can provide draft design via Excel
- Uses common base layers
- Sync AGOL data as required
- Easily deployable – smart phones

2017 Riparian Weed Survey.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW TABLE TOOLS DESIGN

P16

	A	B	C	N	O
1	type	name	label	choice_filter	repeat_count
2	start	survey_start			
3	end	survey_end			
4	today	today			
5	date	date	Date		
6	geopoint	location	Location		
7	select_one Zone	Zone	Zone		
8	select_one Site_ID	Site_ID	Site ID	zone=\${Zone}	
9	select_one plot	Distance	Plot distance		
10	select_multiple weed_type or other	weed_type	Weeds		
11	select_one rating	rating	Rating (1-5)		
12	text	weed_note	Notes		
13					
14	begin group	properties	@location properties		
15	decimal	latitude	Latitude		
16	decimal	longitude	Longitude		
17	decimal	direction	Direction		
18	end group				
19					
20	image	image	Capture Photo / Browse to Photo		
21					
22					
23					

2degrees 8:41 PM 31%

Riparian Weed Survey

Location

37°47'S 175°18'E ± 847.232 m

Zone

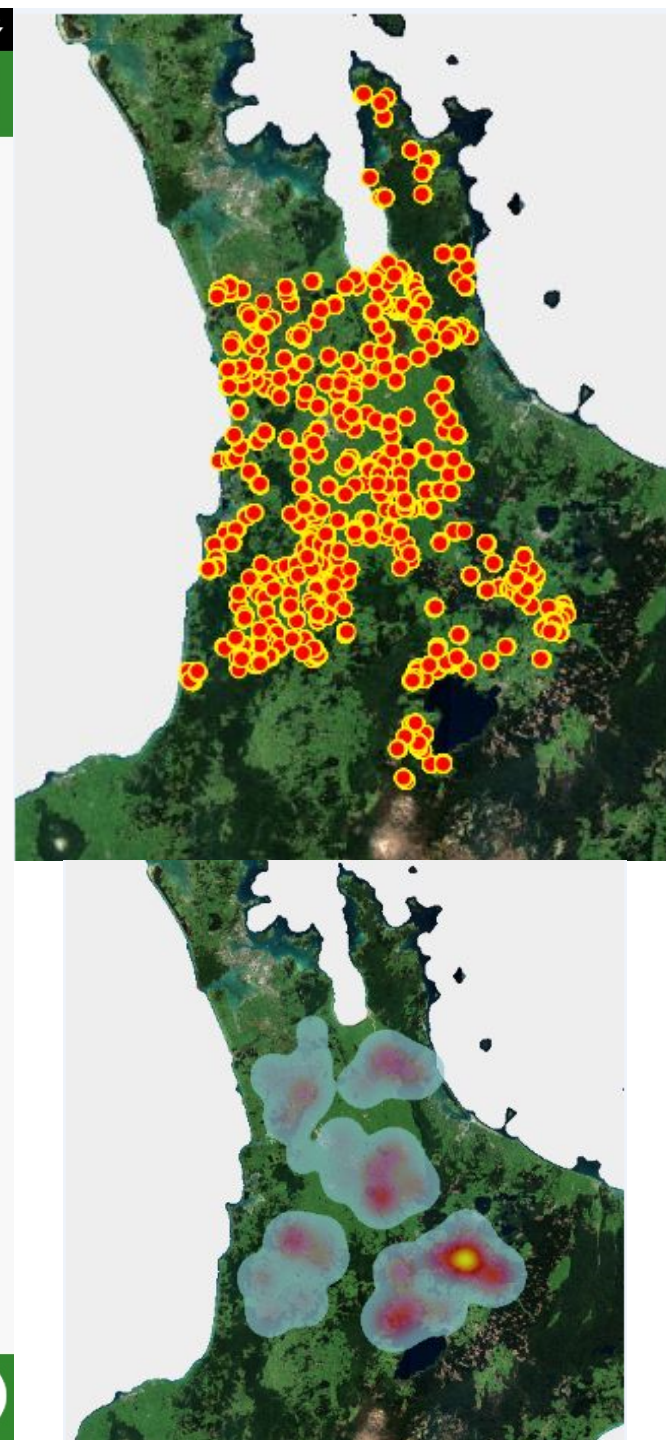
Site ID

Plot distance

Weeds

Type of weed

✓



Mobile technology

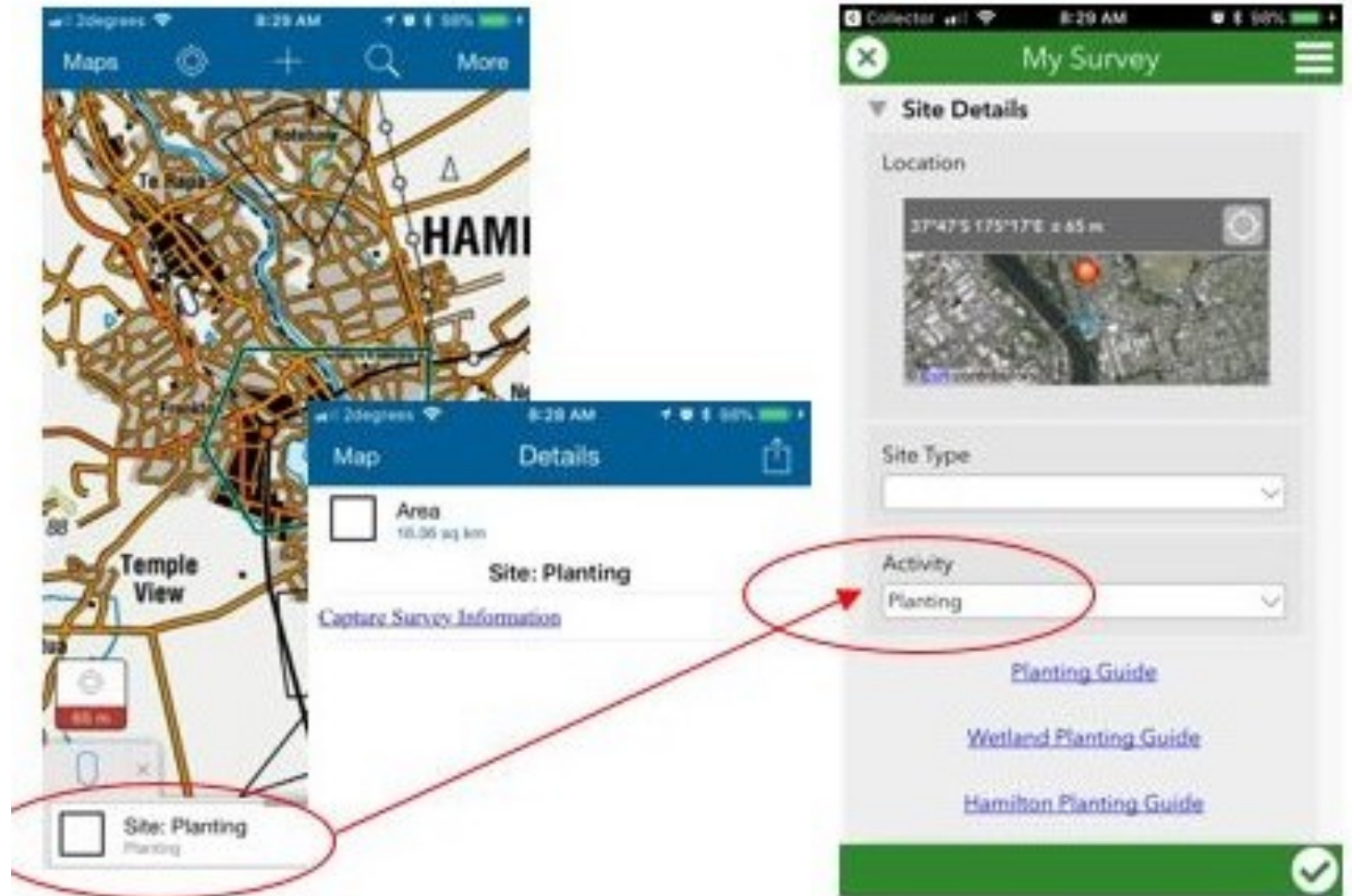
Combining Collector & Survey123 in one app

Biodiversity Community Group Survey

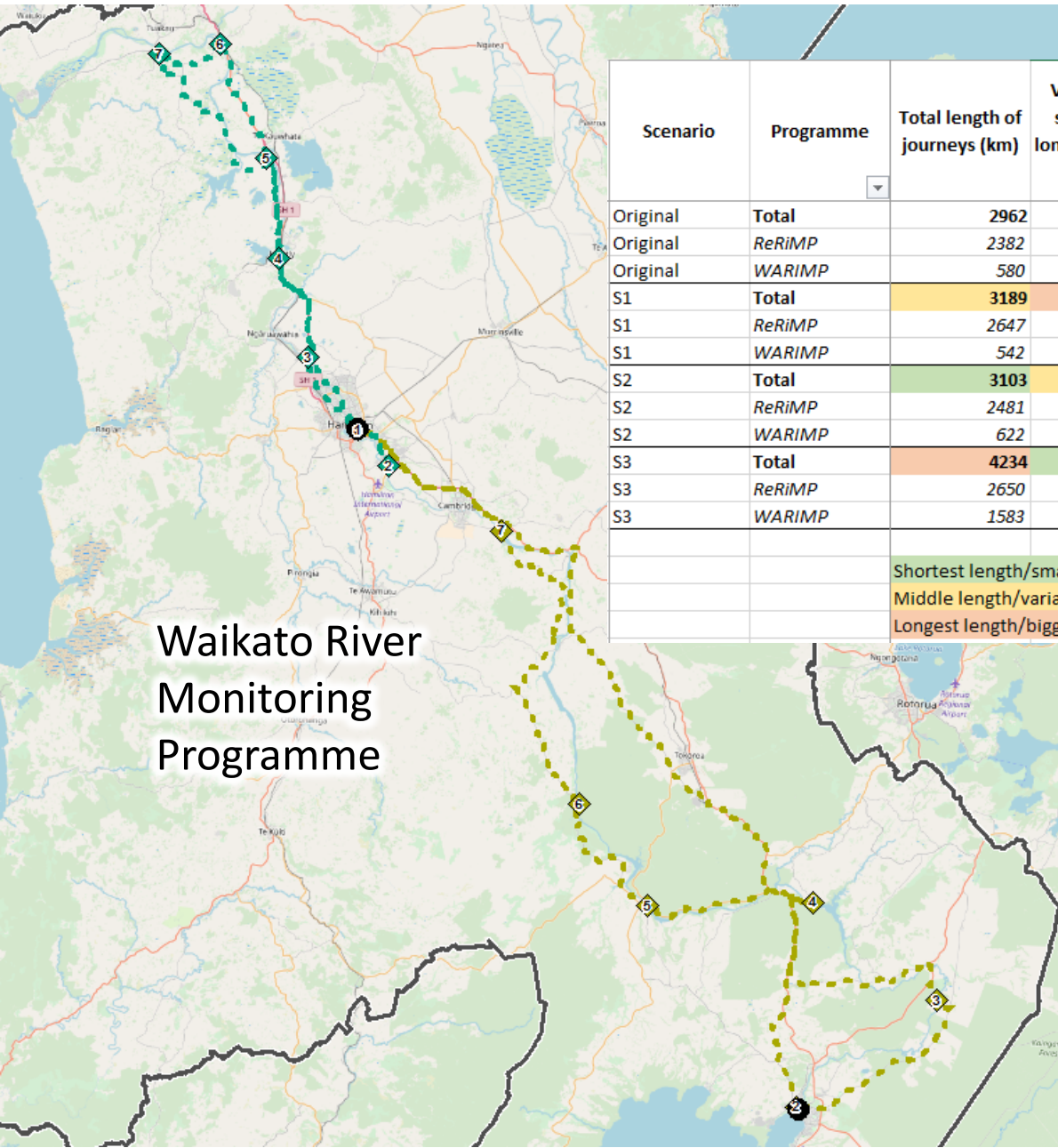
- Capture planting area in Collector ...
- Automatically populates that field in Survey123 with that activity!
- Continue point and attribute capture in S123

Some applications

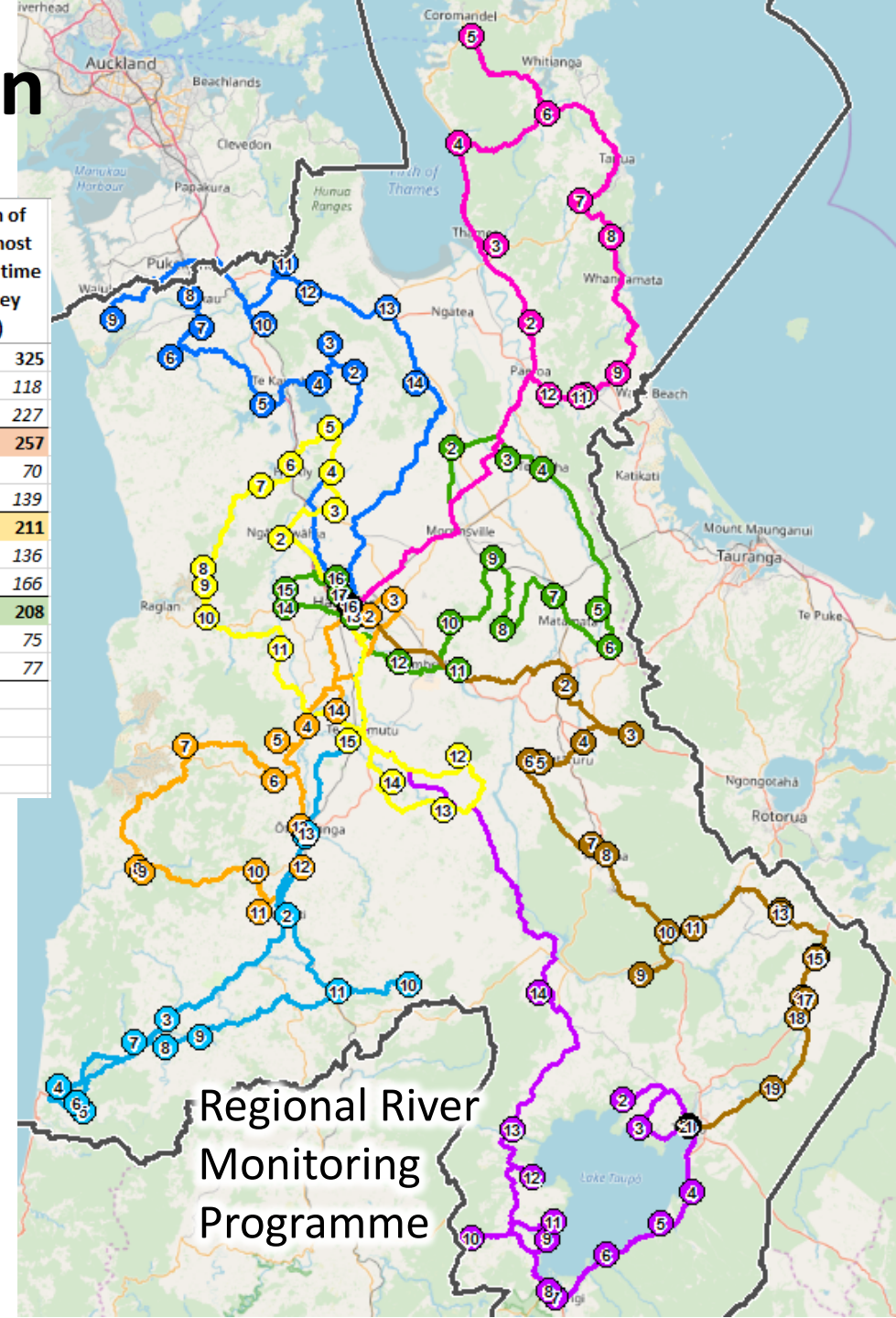
- Alligator Weed Survey
- Bio-Security Property Identification
- Biodiversity Community Group Survey
- Bus Stop Identification Survey
- Catchment Condition Survey
- Coastal Structures Survey
- Evergreen Buckthorn Weed Survey
- Farm Environment Plan Survey
- Navigation Aides and Signage Survey
- Riparian Weed Survey
- Taupo Wave Extent Survey
- Scallop and Fishing Hotspot Survey



Network analysis for route optimisation

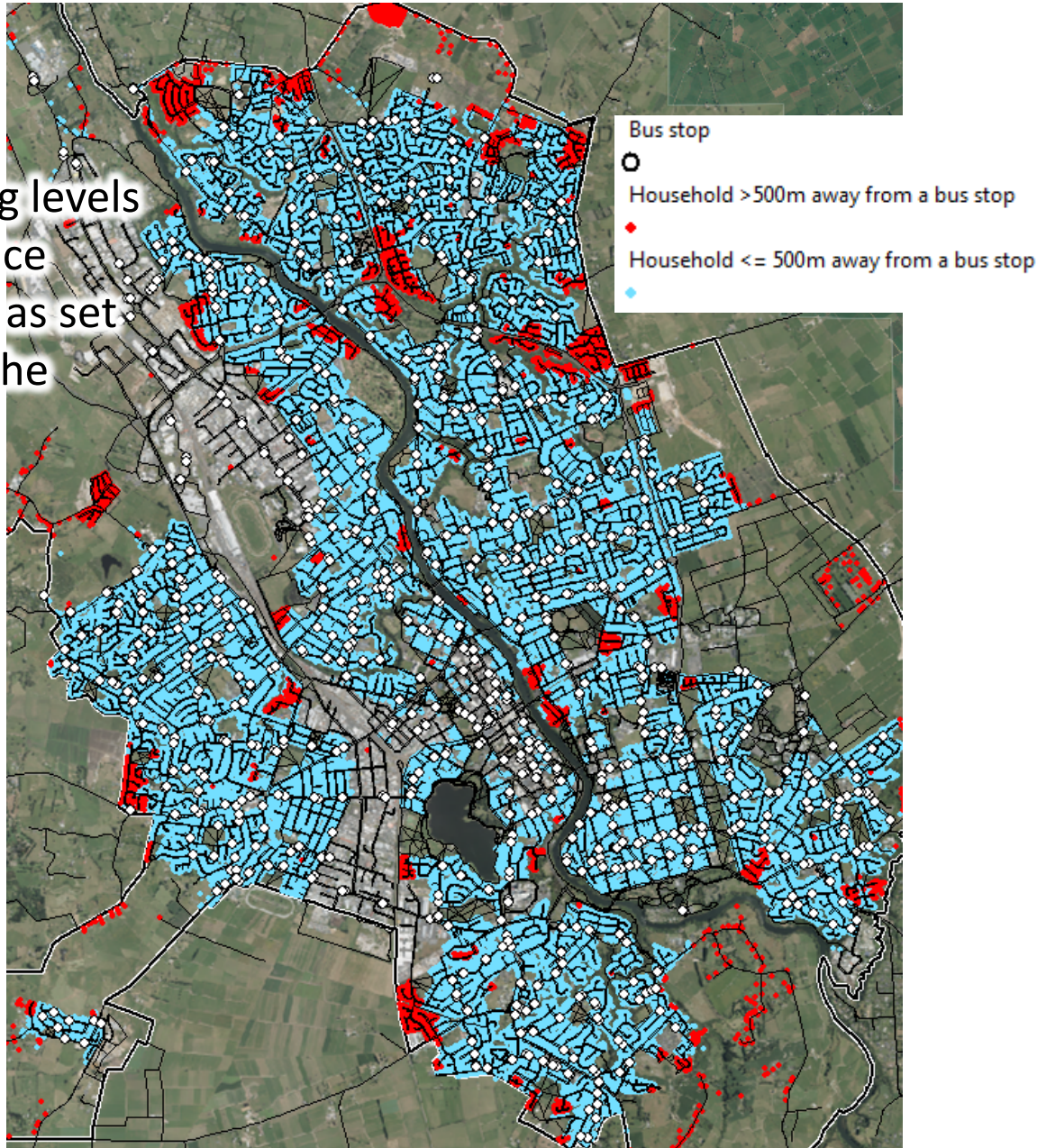


Scenario	Programme	Total length of journeys (km)	Variation of shortest to longest journey (km)	Total estimated time of journeys (mins)	Variation of least to most estimated time of journey (mins)
Original	Total	2962	223	4171	325
Original	ReRiMP	2382	144	3466	118
Original	WARiMP	580	223	705	227
S1	Total	3189	220	4521	257
S1	ReRiMP	2647	119	3874	70
S1	WARiMP	542	185	647	139
S2	Total	3103	181	4456	211
S2	ReRiMP	2481	219	3690	136
S2	WARiMP	622	181	766	166
S3	Total	4234	179	4554	208
S3	ReRiMP	2650	162	3877	75
S3	WARiMP	1583	143	677	77
		Shortest length/smallest variation			
		Middle length/variation			
		Longest length/biggest variation			

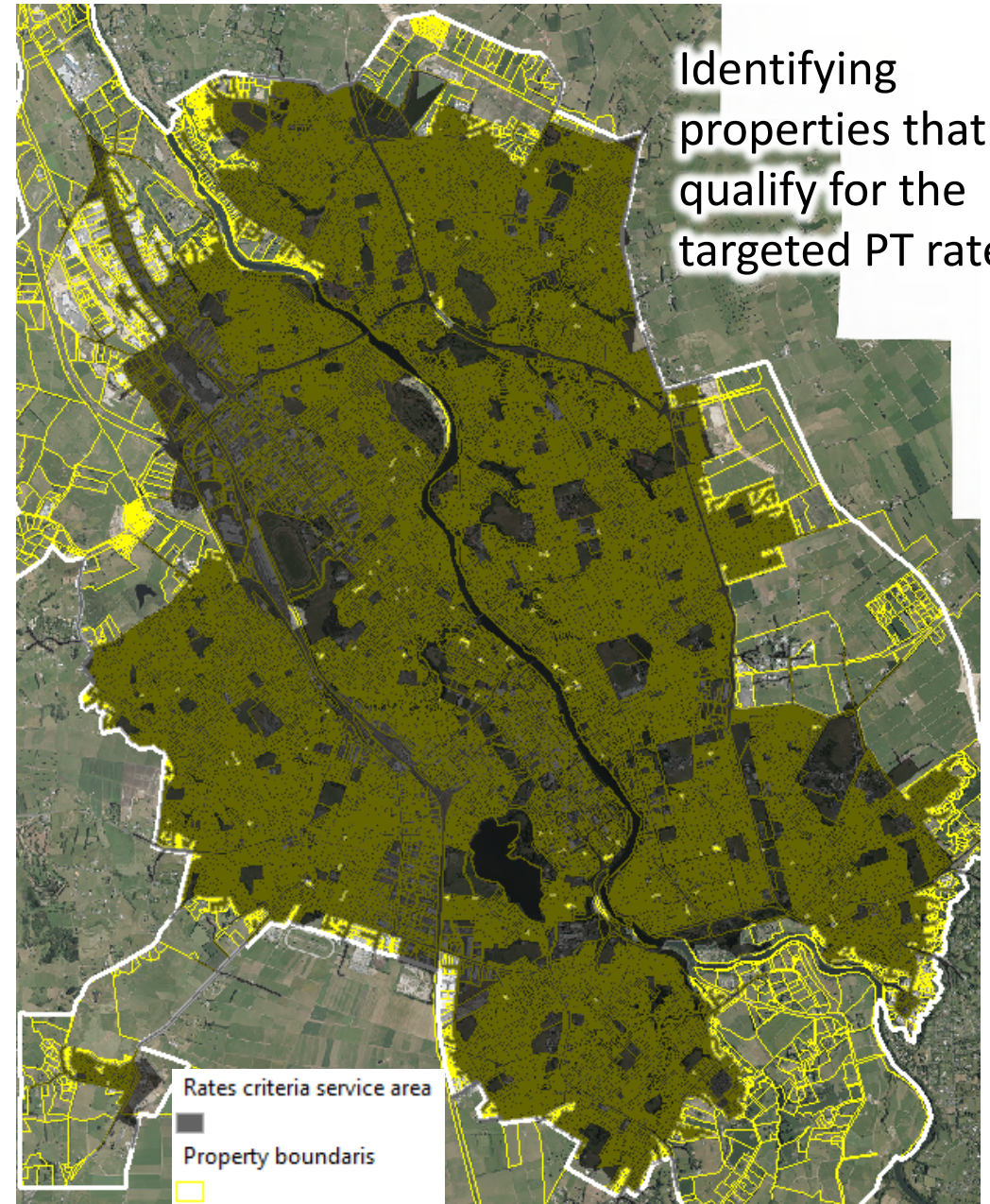


Network analysis for public transport

Tracking levels of service targets as set out in the RLTP.

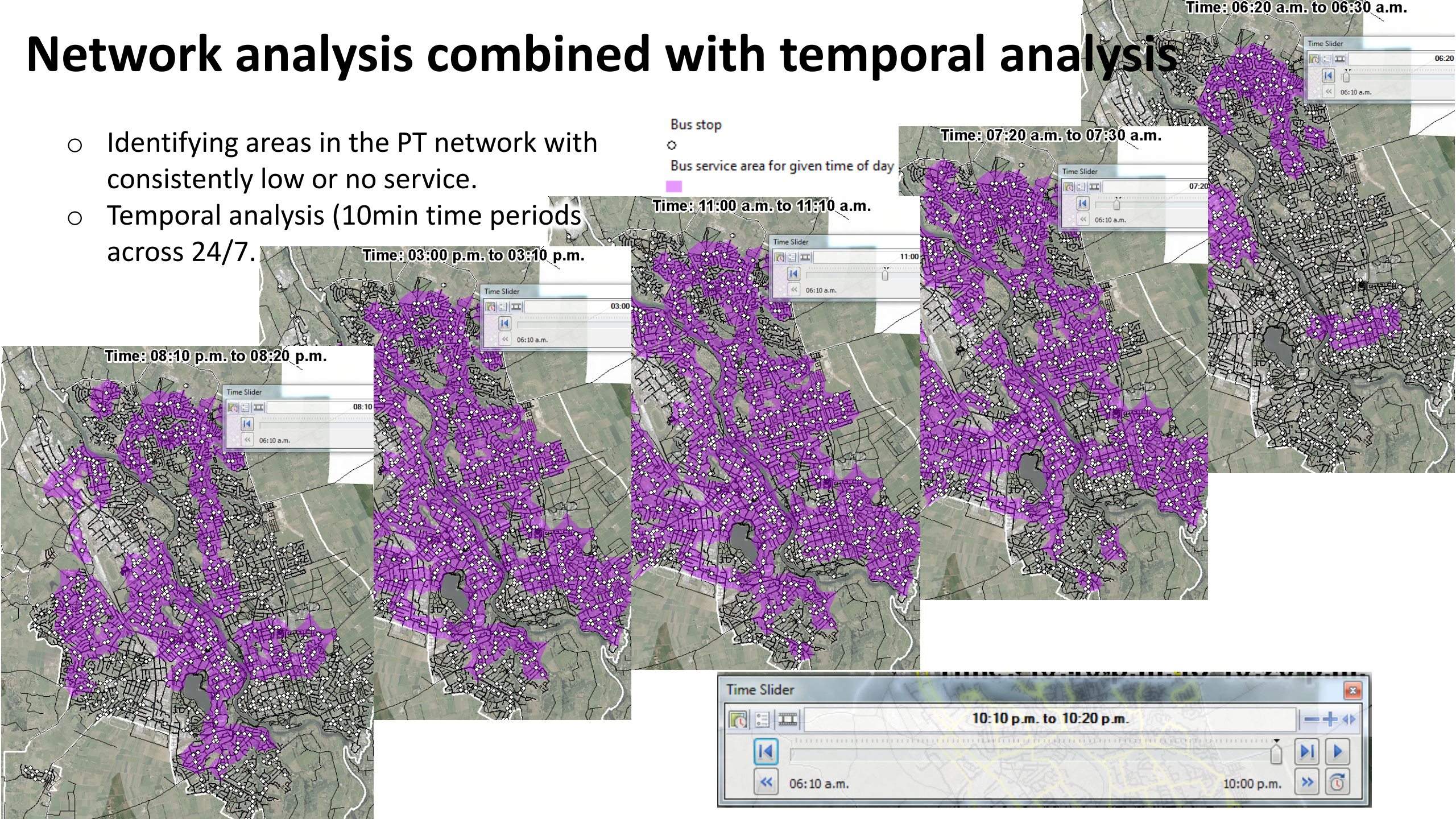


Identifying properties that qualify for the targeted PT rate.



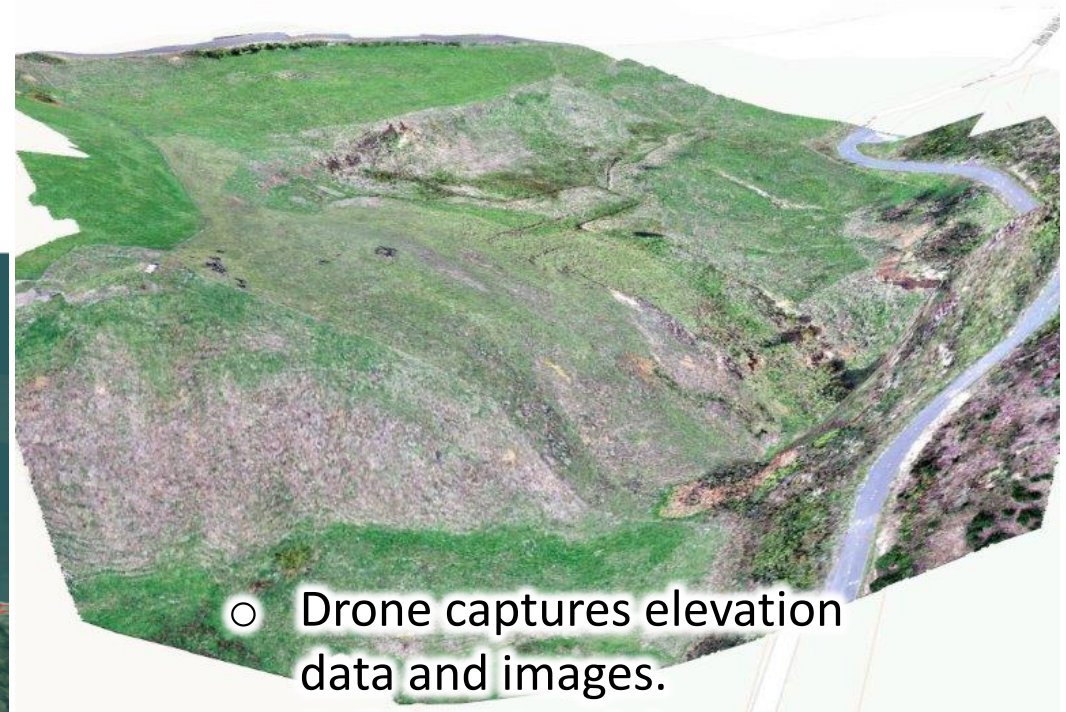
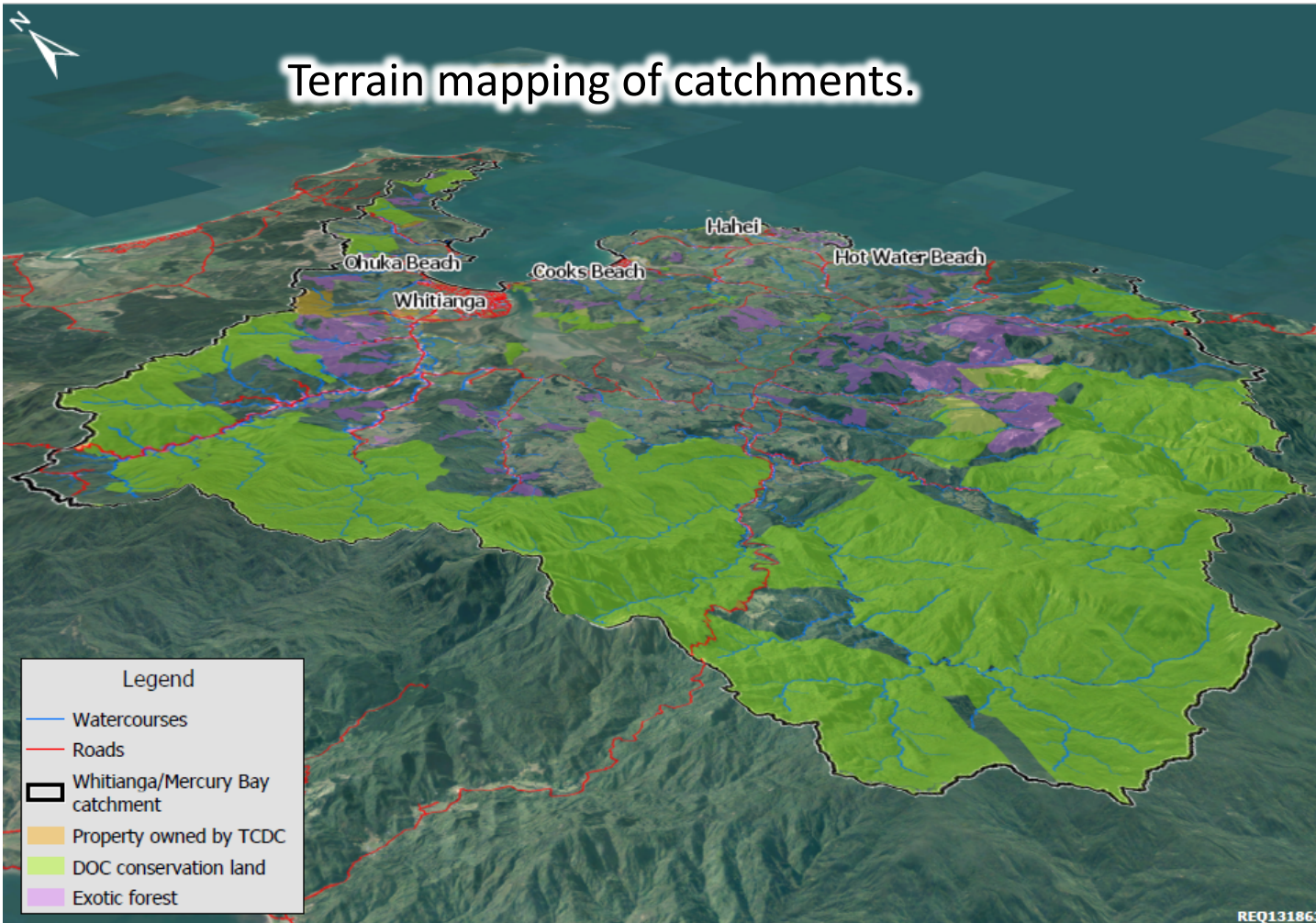
Network analysis combined with temporal analysis

- Identifying areas in the PT network with consistently low or no service.
- Temporal analysis (10min time periods across 24/7).



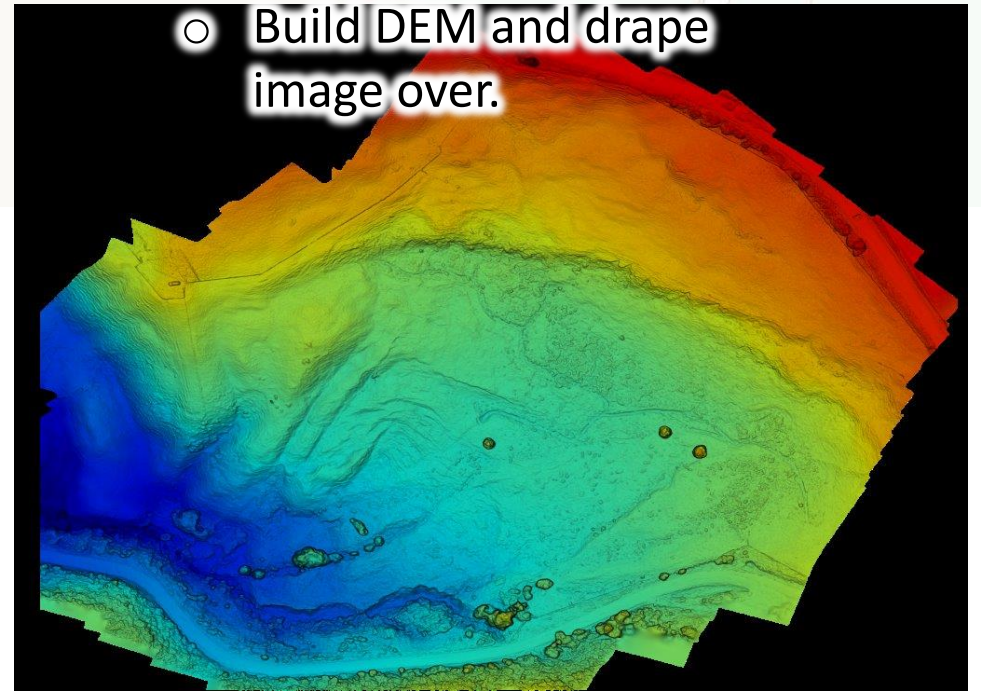
3D mapping using ArcPro

Terrain mapping of catchments.



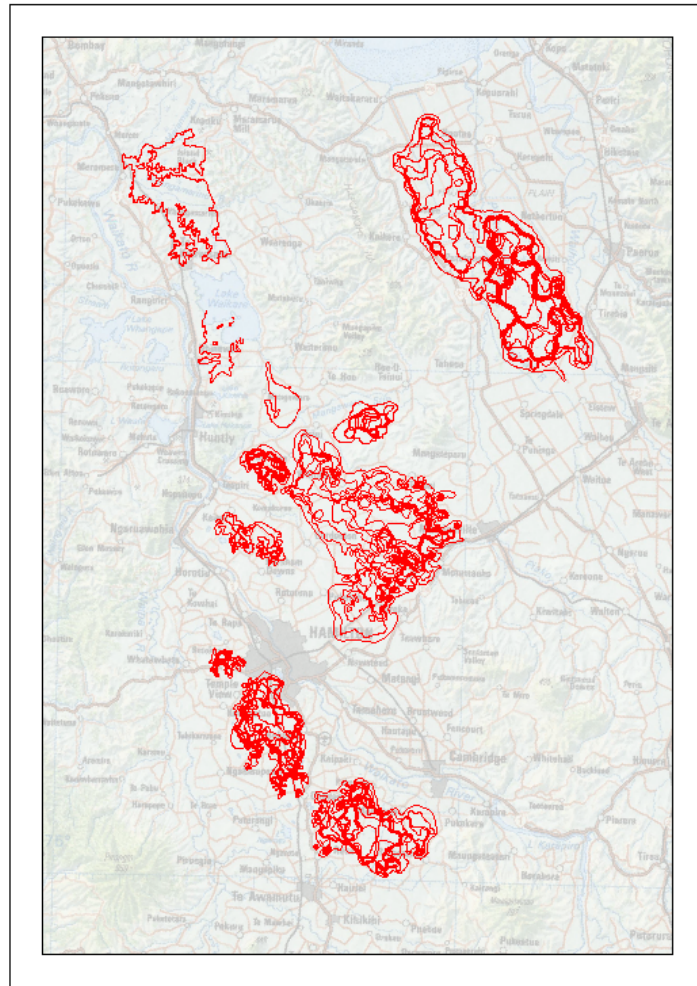
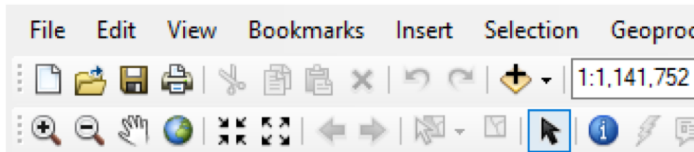
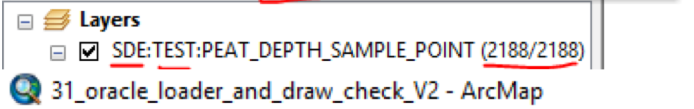
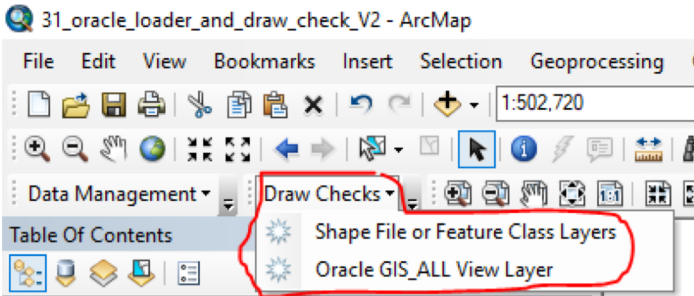
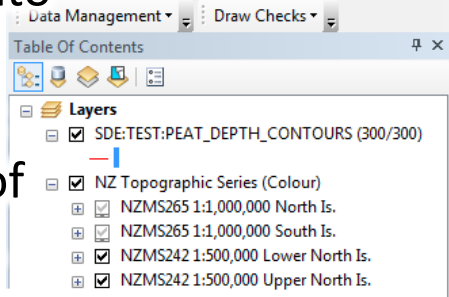
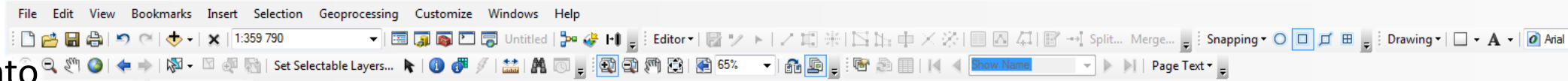
○ Drone captures elevation data and images.

○ Build DEM and drape image over.



Automation using python scripting

- Automation of loading feature classes in .GDB into Oracle.
- Running the post load processing of views and tables.



Oracle Loader:

Databases TEST
 Schema GIS_DATA_STORE
 Table PEAT_DEPTH_CONTOURS

Draw Check:

Add layers to be checked to Table of Contents then Click on the Draw Checks and then
 a) Feature Class or Shape File or
 b) Oracle GIS_ALL View

A - Drop View (unregister, ungoom, delete from user_sdo_geom_metadata, save comment)
 B - Drop Table (check dependencies, delete from user_sdo_geom_metadata, save indexes)
 C - Create Table (from specified source)
 D - Load Data (from specified source)
 E - Post load processing only (table)
 insert into user_sdo_geom_metadata (base table)
 create spatial index (base table)
 grant select on table to gis_all
 F - Create View
 G - Post load processing only (View)
 insert into user_sdo_geom_metadata (view)
 goom (view)
 grant select to si_metadata_owner (view)
 update arc_view_detail (view details)
 oracle geometry check (view)
 register (view)

Run Option 7
 1 = A
 2 = A,B
 3 = A,B,C
 4 = A,B,C,D
 5 = A,B,C,D,E
 6 = A,B,C,D,E,F
 7 = A,B,C,D,E,F,G
 8 = E
 9 = F
 10 = G
 11 = E,F,G
 12 = A,F,G

DrawCheck YES For existing oracle tables in GIS_ANALYSIS use option

Data for the load process is stored in this spreadsheet :
 S:\Corporate_Data\TEMPLATES\ARCGIS\TOOLS\PYTHON_SCRIPTS\Data_Management\Data\oracle_view_load_data_source.xlsx

If you require to put a new line in this spreadsheet then copy and paste the data from this spreadsheet :
 S:\Corporate_Data\TEMPLATES\ARCGIS\TOOLS\PYTHON_SCRIPTS\Data_Management\Data\oracle_view_loader_data_source_tem

python scripts attached to the buttons in the Data Management Menu reside in :
 S:\Corporate_Data\TEMPLATES\ARCGIS\TOOLS\PYTHON_SCRIPTS\Data_Management

The python script tools are stored in the toolbox:
 S:\Corporate_Data\TEMPLATES\ARCGIS\TOOLS\PYTHON_SCRIPTS\Data_Management\Data_Management.tbx

Automation using python scripting

200_Extract_Contours - ArcMap

The screenshot displays the ArcMap software interface. The menu bar includes File, Edit, View, Bookmarks, Insert, Selection, Geoprocessing, Customize, Windows, and Help. The toolbar shows various navigation and editing tools. The main map area displays a grayscale aerial photograph with red contour lines overlaid. A cyan-colored polygon boundary is drawn on the map, representing a property boundary. The interface includes a 'Layers' panel on the left with the following items:

- LiDAR Contours ▾ 5 metre Contours ▾
- Area Of Interest
- Property Selection
- Layers
- CONTOURS_LIDAR (Feature Class)
- op_area_roads
- CONTOURS_LIDAR (DWG File)
- CONTOURS_LIDAR (Shape File)
- CRS_PROPERTY_WHOLE_REGION
- LIDAR_REGIONAL_EXTENT

Below the Layers panel, a legend titled 'DATASET_NAME' lists the following items:

- Aerial Photography and LiDAR -
- LiDAR - 2007/2008
- LiDAR - 2010/2011
- LiDAR - 2012/2013

Data supply:
extraction of
LiDAR derived
contours or 5m
contours clipped
to a property
boundary or area
of interest.

Automation using python scripting

Monitor Map - ArcMap

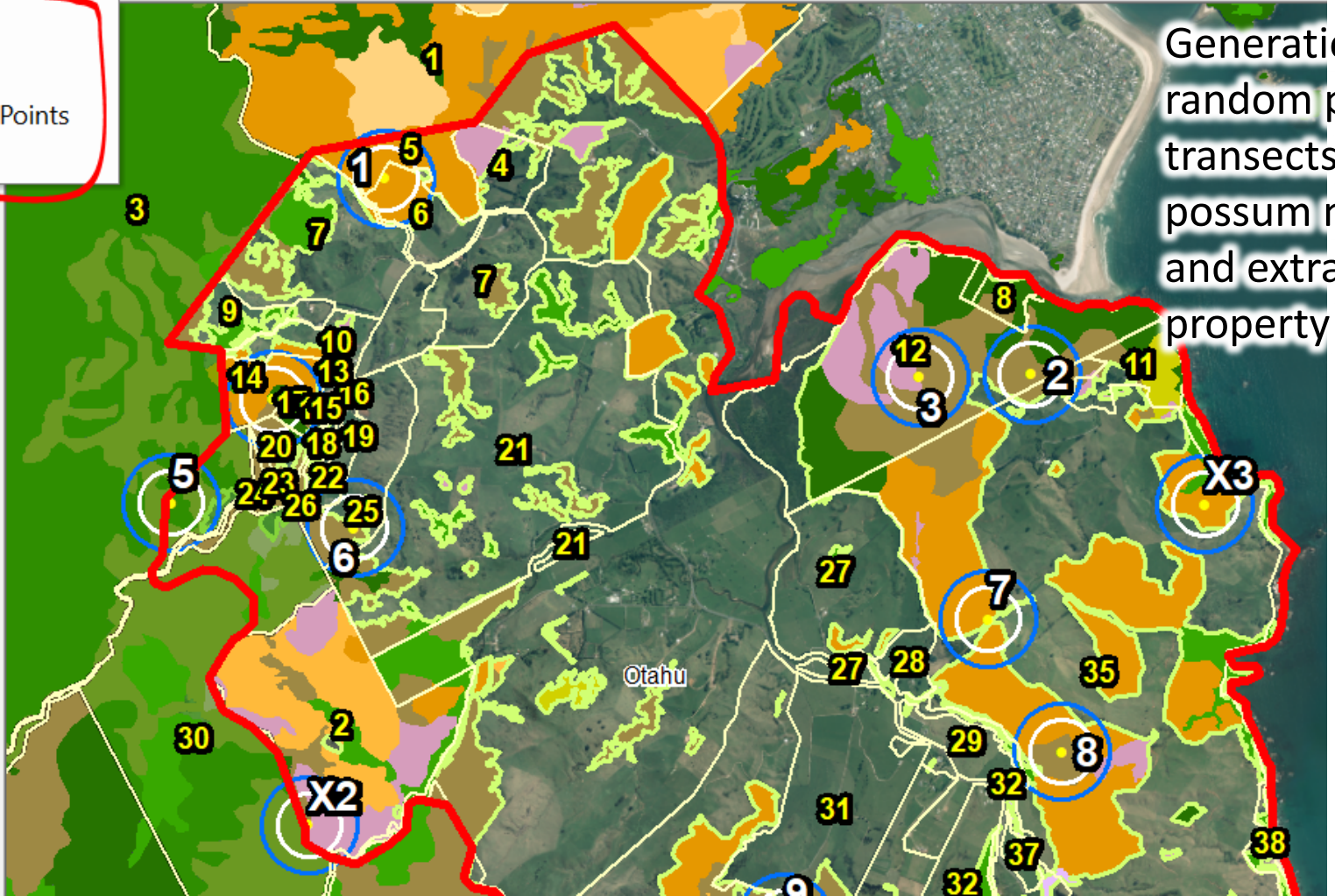
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:52,336 46%

RTCI Menu

- Create Random Points
- Update Random Points
- Create Random Point Addresses And Start Points
- Move Random Points to PEMS

- random_points_properties_gt_2_ha
- random_points
- buffer_200
- buffer_300
- council_random_points_properties_c
- doc_random_points_properties_gt_2
- bioveg_clip_dissolved
- op_area_roads
- BIODIVERSITY_VEGETATION_2012
- LCDR2_NAME



Generation of random point transects for possum monitoring and extracting property details.

Automation using python scripting

Table

TRK_GROUP

OBJECTID*	Shape*	Name	Track_Date	From_Time	To_Time	Track_Sub
46	Polyline	KARA-05-11 10:18:43	2018-05-11	07:42:18	10:19:03	1
47	Polyline	KARA-06-21 08:42:33	2018-06-06	08:24:56	12:34:03	1
48	Polyline	KARA-06-21 08:42:33	2018-06-15	09:00:46	12:01:15	2
49	Polyline	KARA-06-21 08:42:33	2018-06-20	08:52:02	13:38:31	3
50	Polyline	KARA-06-21 08:42:33	2018-06-21	08:25:26	08:43:02	4

TRK_GROUP

The screenshot shows the QGIS interface. In the top toolbar, the 'Process GPX Files' tool is highlighted with a red circle. The 'Layers' panel on the right shows a tree view with 'GPX Processing' checked, containing 'WPT_GROUP' and 'TRK_GROUP', both also checked and highlighted with a red circle. Below them are 'NZ Topographic Series' layers. The main map view displays a topographic map of the Karapiro area with red lines representing GPX tracks and blue dots representing waypoints.

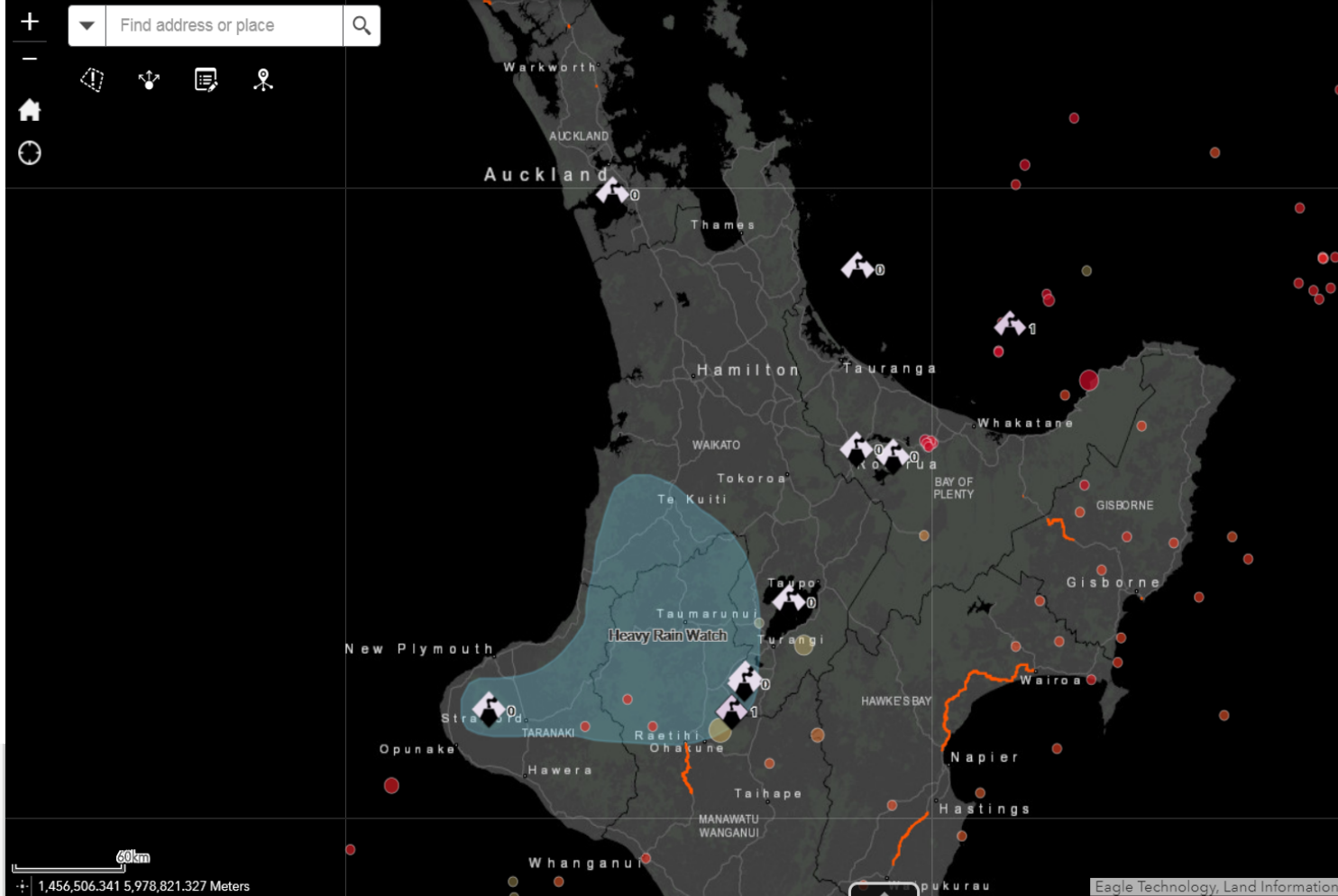
- Processing of multiple .GPX files.
- Convert waypoints and tracklogs and plot data.
- Option to split tracks out a gap parameter (time or distance).

Tools for CDEM

* NZGIS4EM *



WAIKATO REGION EMERGENCY MANAGEMENT **Situational Awareness Viewer - Beta** Your one stop shop for getting an overview of most situations.



Legend

NZ Volcanic Alert Level

- 1
- 0

Recent quakes over deep

Depth (km)

> 100

50

< 0

Magnitude

- > 8
- 7
- 6
- 5
- < 4

NZTA Highway Status Lines (TREIS)

Road Closed

WINDSHIELD SURVEY S1 UAT

Incident location *

May be detected if you have location services activated on your device. If not, tap the map below to set your location.

37°47'S 175°17'E ± 65 m

Incident type *

Start typing, if your incident type does not appear select/type 'Other'

Description (Optional)

Operations Dashboard for ArcGIS

Workforce for ArcGIS

WAIKATO REGION EMERGENCY MANAGEMENT GROUP

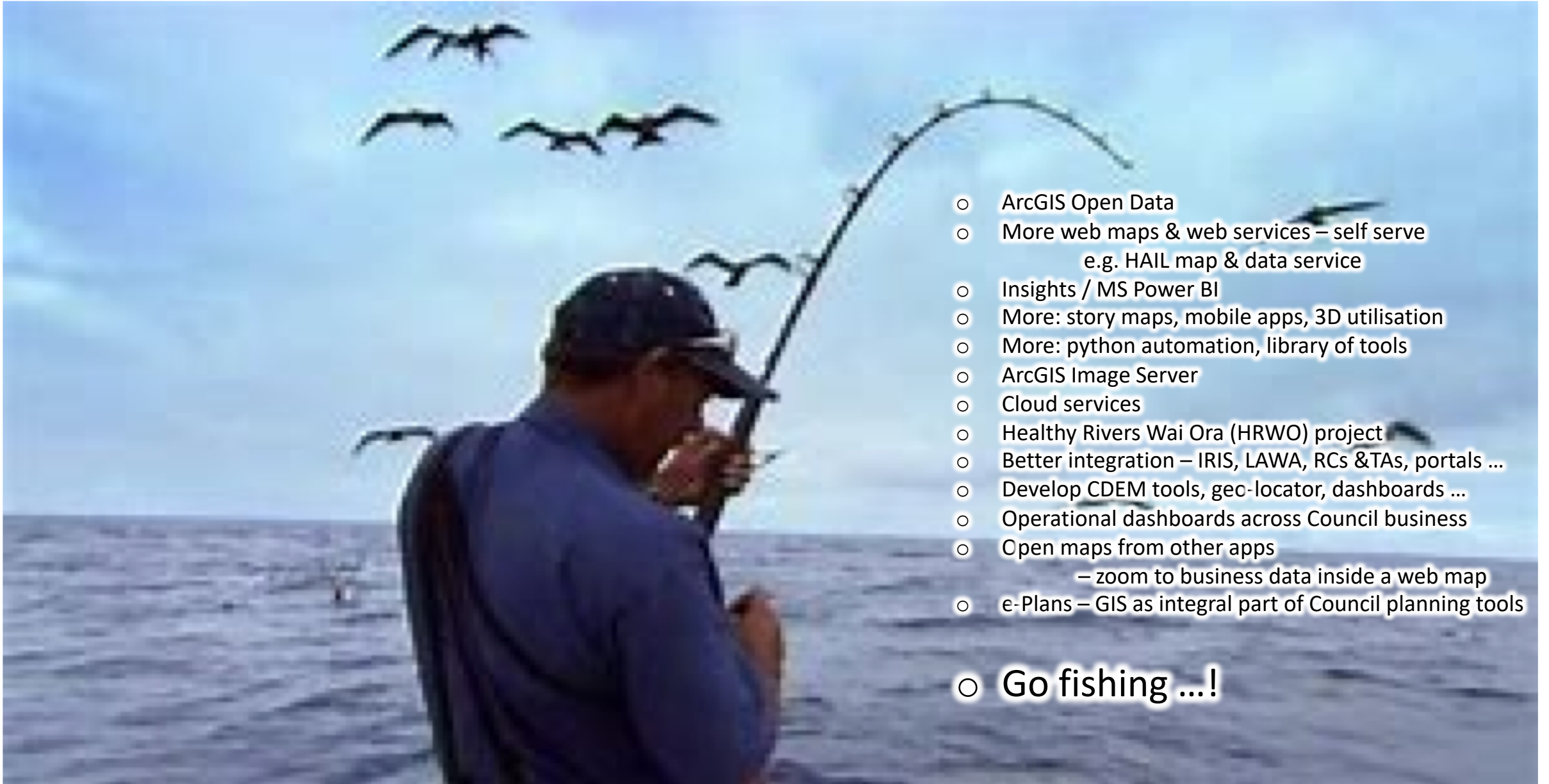
Summary of benefits



- Better support & professional services
- Better GIS workflows for users
- Far greater online resources
- Improved raster analysis
- Easier to recruit – bigger pool of ESRI-trained users
- More tools > greater capacity
- Python > automation > efficiency gains
- Web services & AGOL
- Easier data access > more data sharing, more automated
- Formation of NZGIS4EM + CDEM tools
- Route optimization
- 3D, 4D analysis
- Web apps & mobile integration
- Easier software admin
- Story maps
- Better cartographic tools
- Better web maps > more web map requests
- Increased organizational uptake of GIS
- More timely data through increased use of web services
- Increased productivity
- Reduced costs and lag time to bring new staff up to speed



What next?



- ArcGIS Open Data
- More web maps & web services – self serve
e.g. HAIL map & data service
- Insights / MS Power BI
- More: story maps, mobile apps, 3D utilisation
- More: python automation, library of tools
- ArcGIS Image Server
- Cloud services
- Healthy Rivers Wai Ora (HRWO) project
- Better integration – IRIS, LAWA, RCs & TAs, portals ...
- Develop CDEM tools, geo-locator, dashboards ...
- Operational dashboards across Council business
- Open maps from other apps
– zoom to business data inside a web map
- e-Plans – GIS as integral part of Council planning tools

- Go fishing ...!