Ashley Rakahuri
RIVERCARE GROUP

BRaid
'Braided River Aid'

Use of a drone by the ARRG

Grant Davey

BRaid seminar June 26, 2019

BRaid Drone - Secondhand DJI Phantom 3 Standard - $500

- 12.3 MP fixed focus fixed aperture lens, RAW capable
- Resolution 2.6cm per pixel from 50m
- Ample range, height, speed
- No obstacle avoidance
- Boxy & white – no resemblance to harrier
- Better would be DJI Phantom IV Advanced or Pro (not Pro +), or Mavic Pro II all with more advanced 20.3 MP camera
- Android or Apple device required

Drone Rules

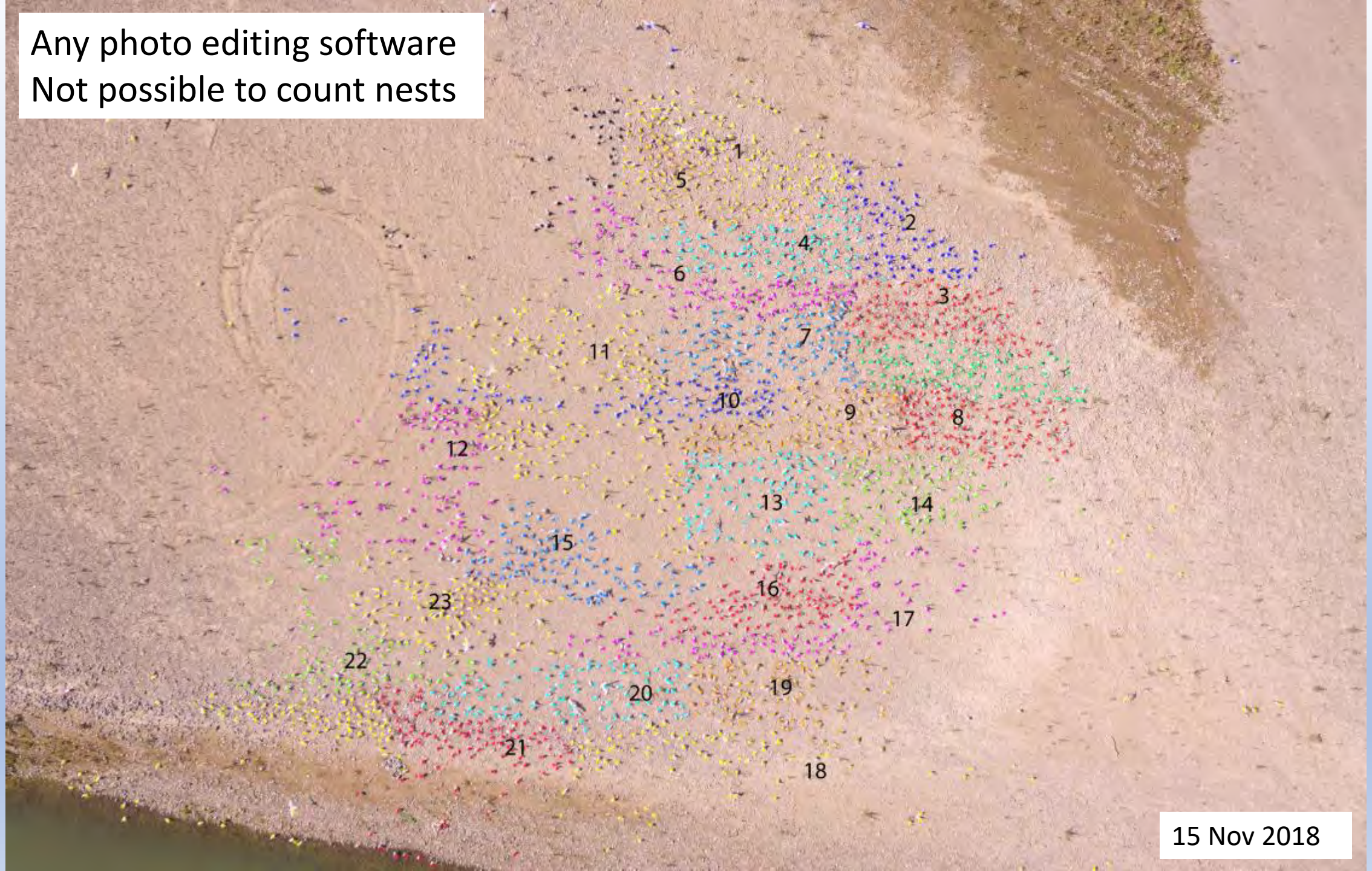
- Need permission of land owner
- Can’t fly without permission within 4km of airfield – obtained this from Rangiora airfield
- Maximum height – 120m
- DoC guideline – don’t fly within 50m of birds
- *Watch out for low flying microlights and helicopters*

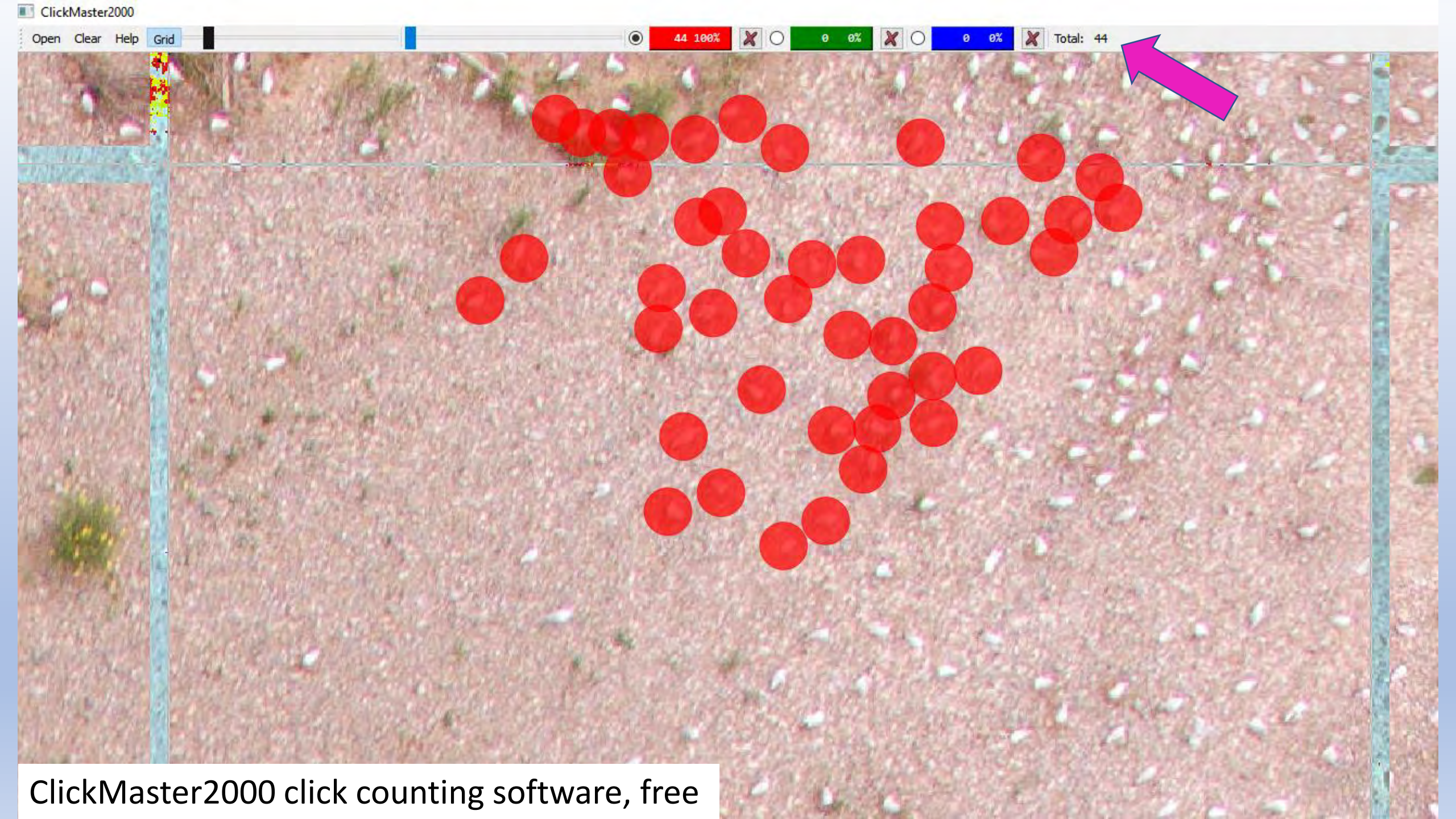
Can’t count gulls without elevated position

30 Dec 2018

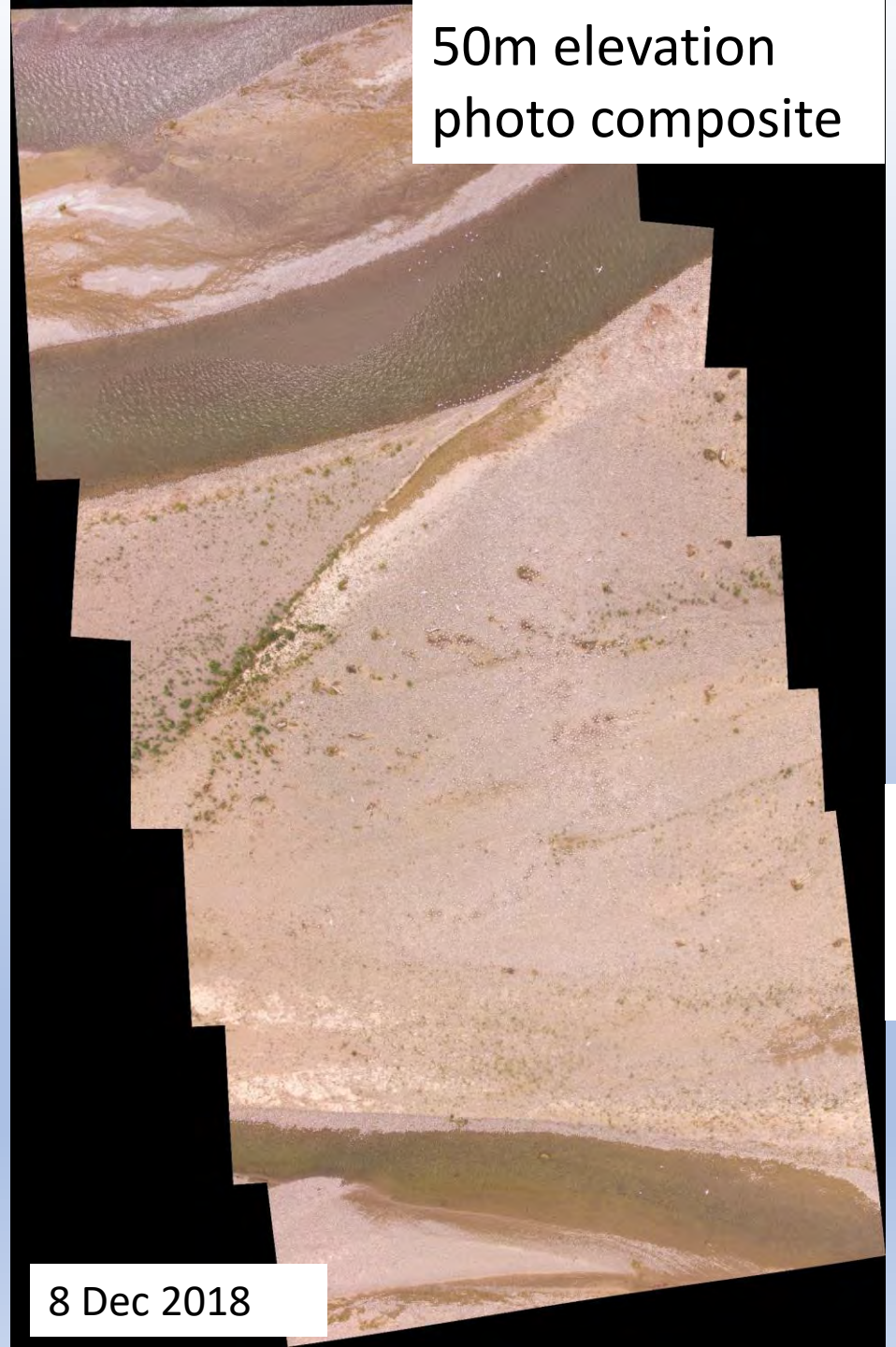
Better but still inadequate

23 Dec 2018

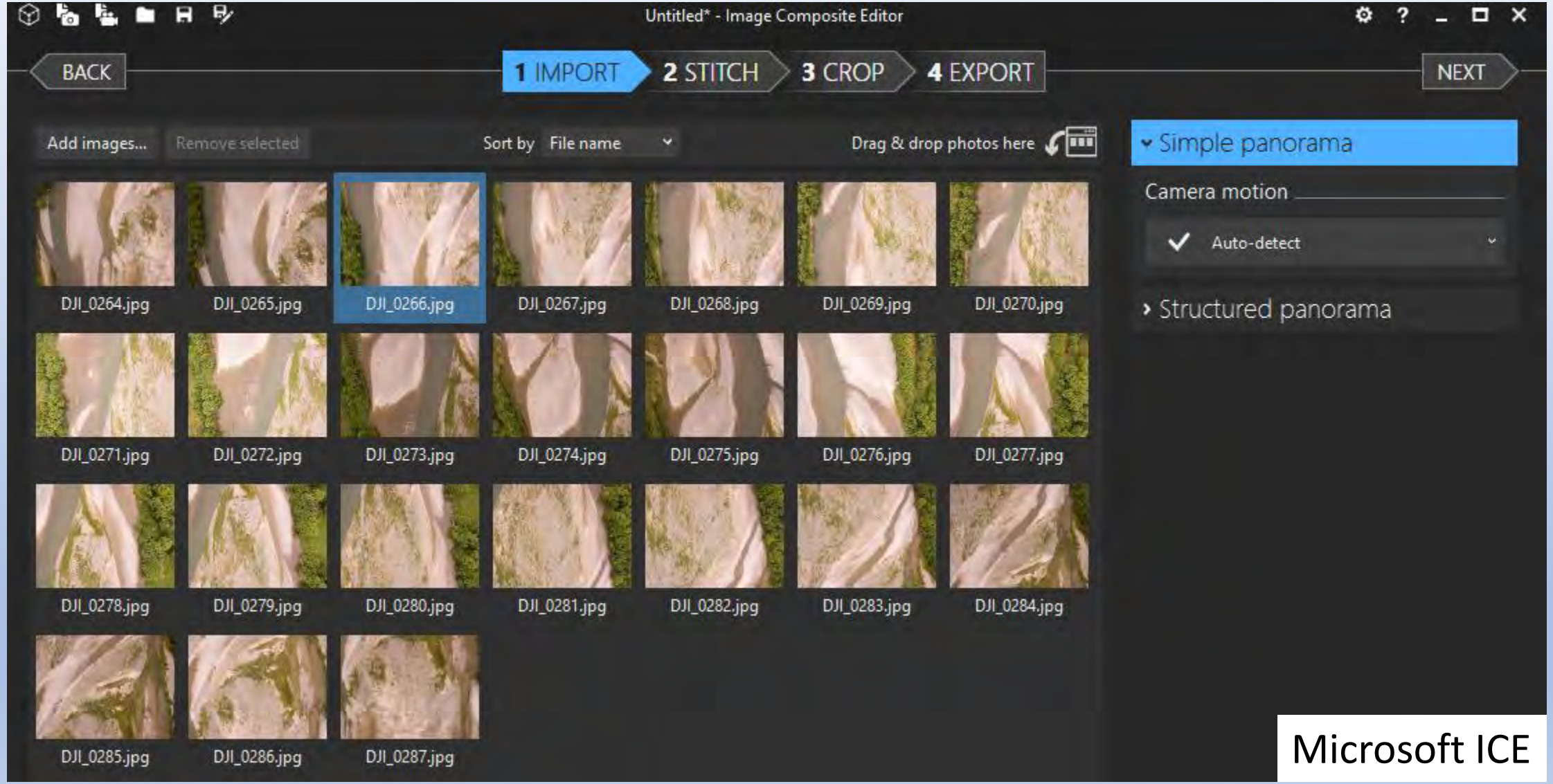

Any photo editing software
Not possible to count nests
1
5
2
4
6
3
7
11
10
9
8
12
13
14
15
16
23
17
22
20
19
21
18
15 Nov 2018



ClickMaster2000 click counting software, free



Microsoft ICE, free. 40 – 50% photo overlap needed to successfully stitch photos


Untitled* - Image Composite Editor
BACK
1 IMPORT
2 STITCH
3 CROP
4 EXPORT
NEXT
Add images...
Remove selected
Sort by
File name
Drag & drop photos here
Simple panorama
Camera motion
Auto-detect
Structured panorama
DJI_0264.jpg
DJI_0265.jpg
DJI_0266.jpg
DJI_0267.jpg
DJI_0268.jpg
DJI_0269.jpg
DJI_0270.jpg
DJI_0271.jpg
DJI_0272.jpg
DJI_0273.jpg
DJI_0274.jpg
DJI_0275.jpg
DJI_0276.jpg
DJI_0277.jpg
DJI_0278.jpg
DJI_0279.jpg
DJI_0280.jpg
DJI_0281.jpg
DJI_0282.jpg
DJI_0283.jpg
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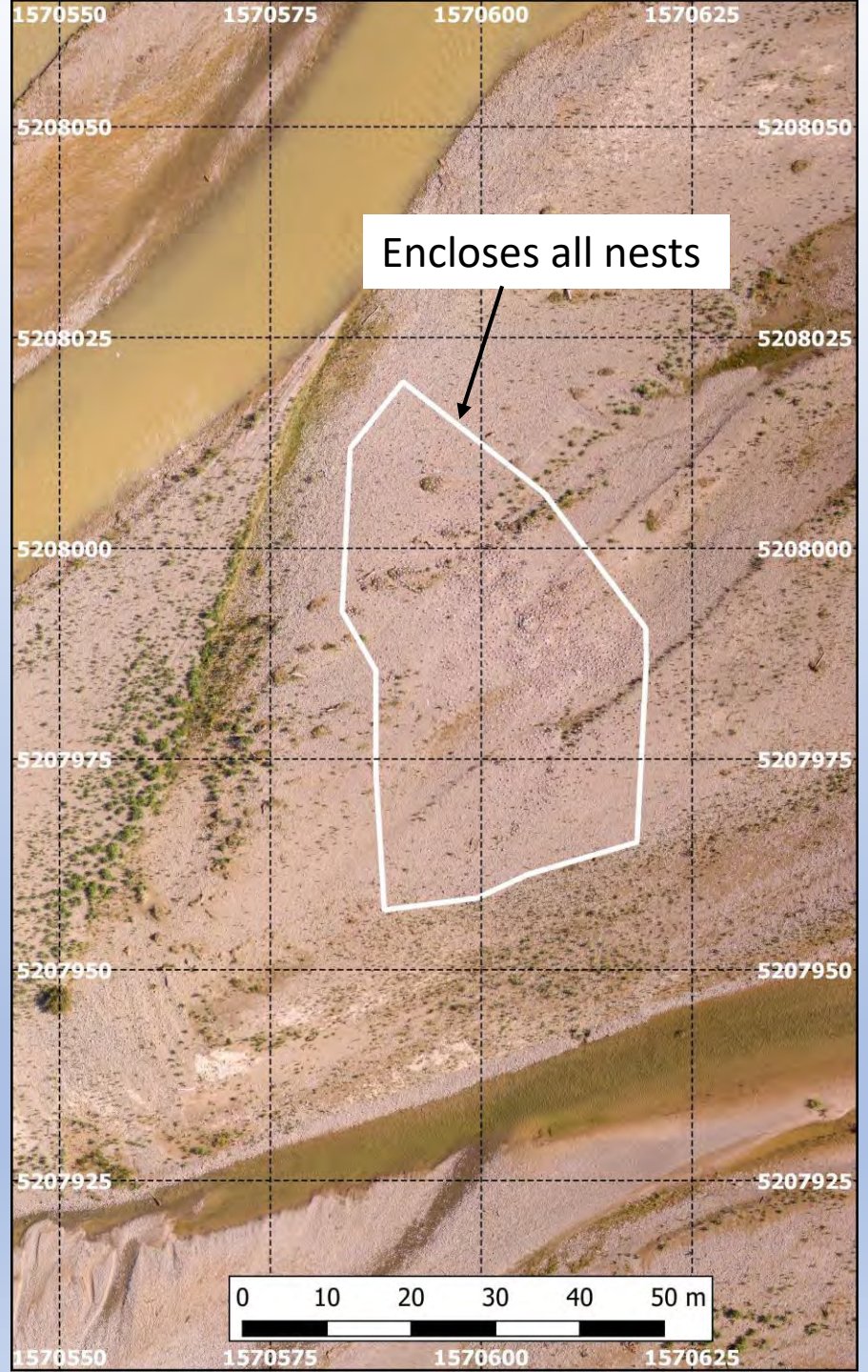
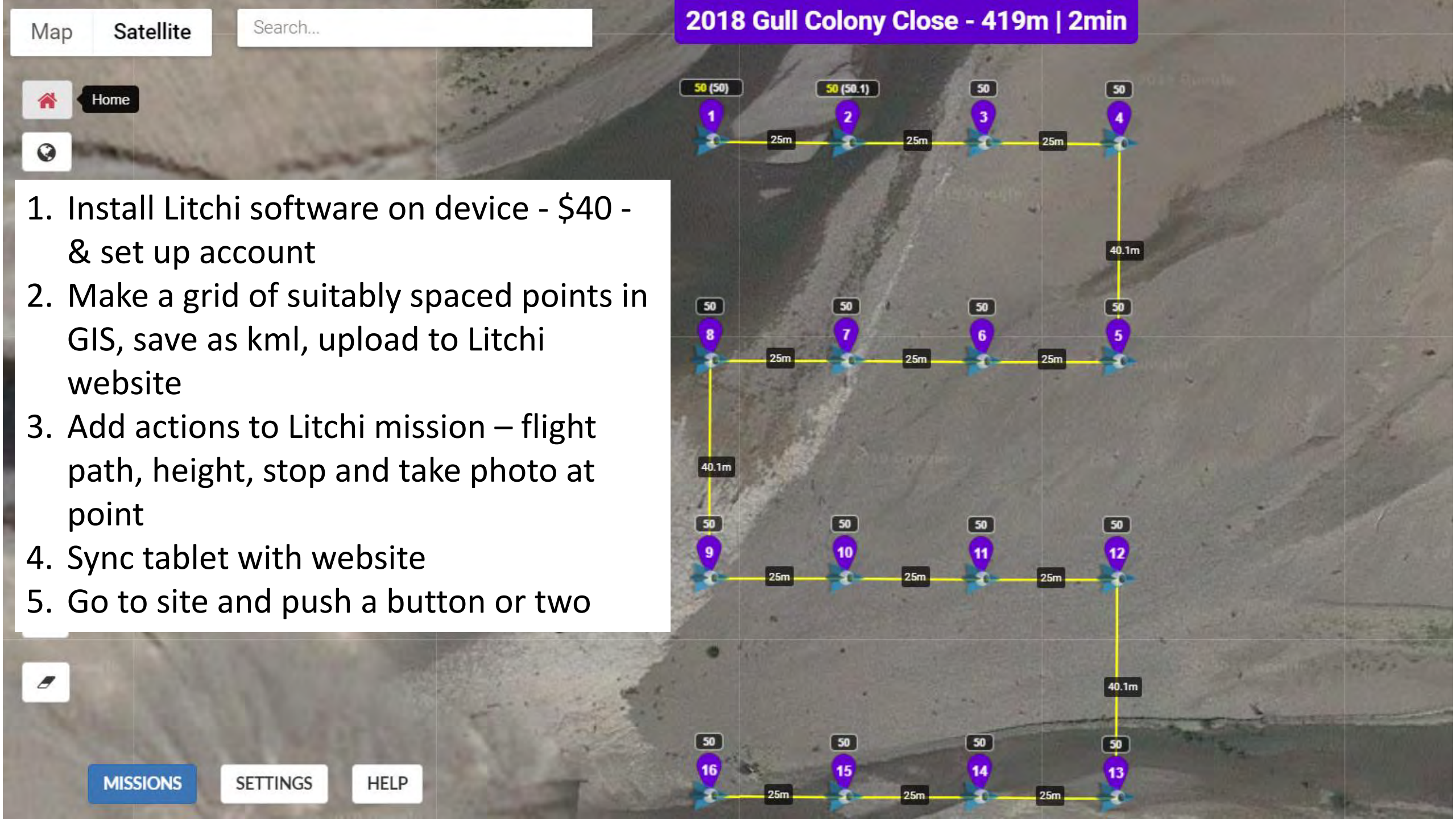
DJI_0285.jpg
DJI_0286.jpg
DJI_0287.jpg
Microsoft ICE

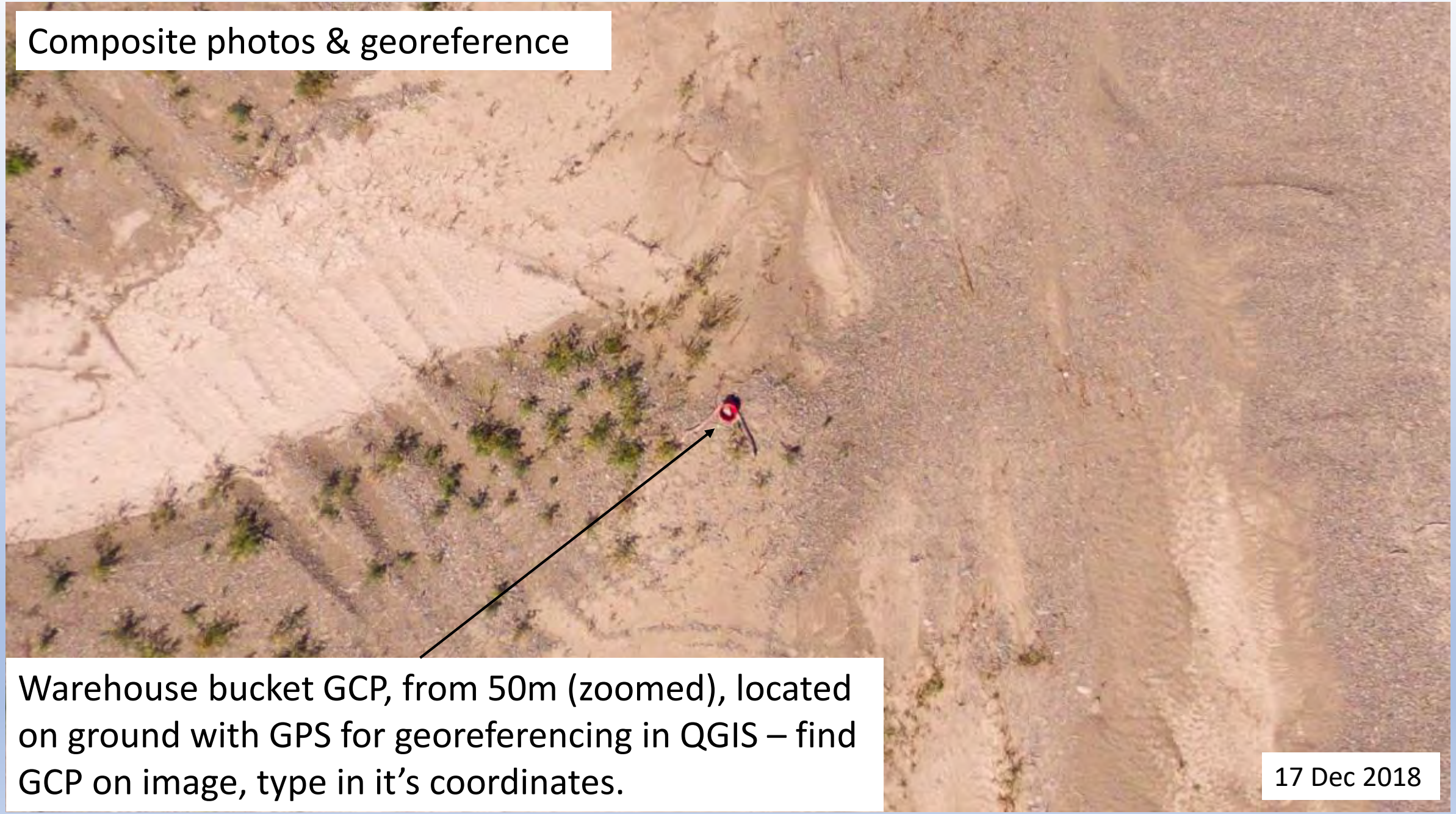


Georeferenced photo mosaic - 16 stitched photos from 50m height, georeferenced with free QGIS, 24 Dec 2018



1. Install Litchi software on device - $40 - & set up account
2. Make a grid of suitably spaced points in GIS, save as kml, upload to Litchi website
3. Add actions to Litchi mission – flight path, height, stop and take photo at point
4. Sync tablet with website
5. Go to site and push a button or two

Composite photos & georeference

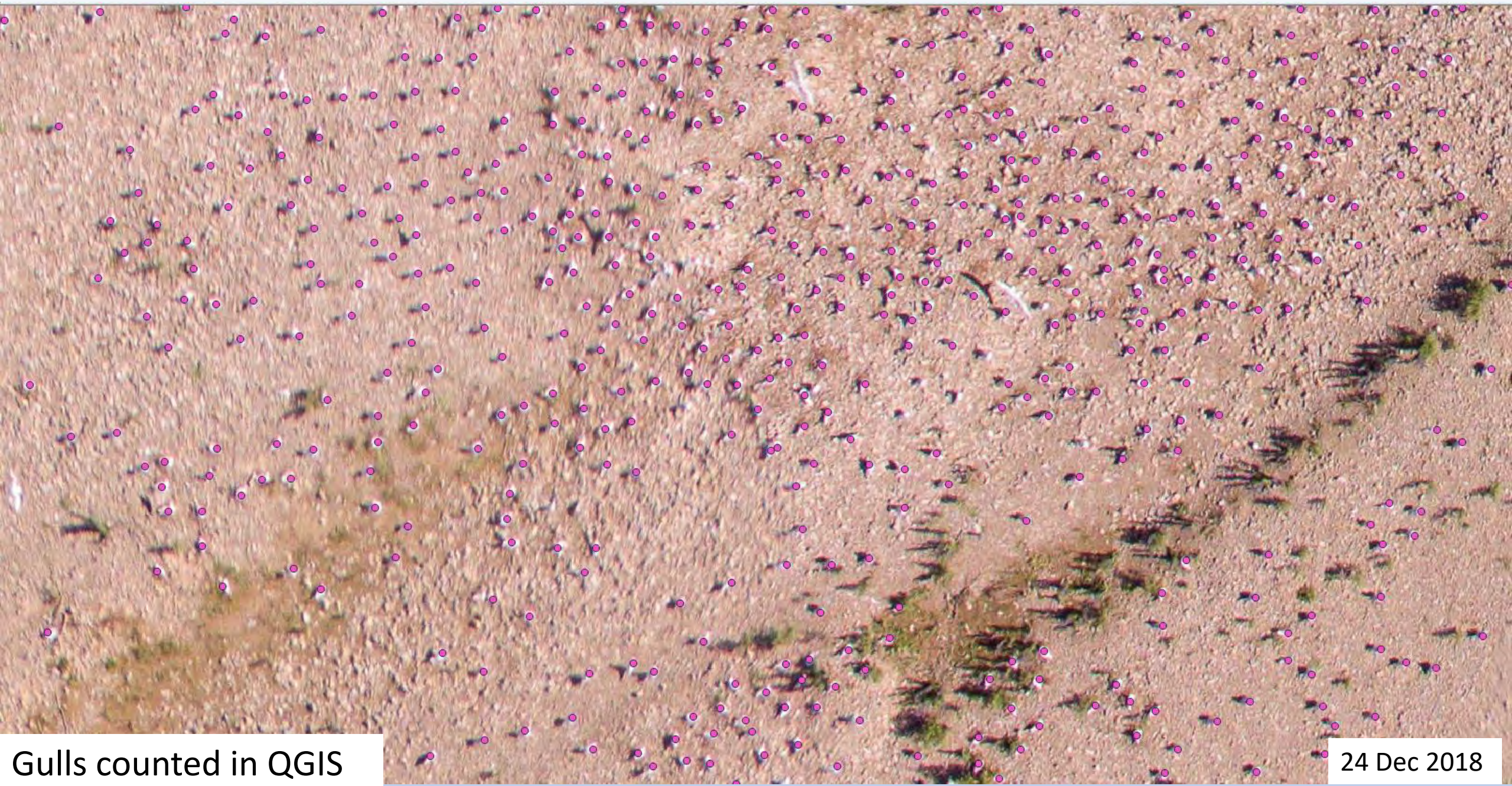


Warehouse bucket GCP, from 50m (zoomed), located on ground with GPS for georeferencing in QGIS – find GCP on image, type in it's coordinates.

17 Dec 2018

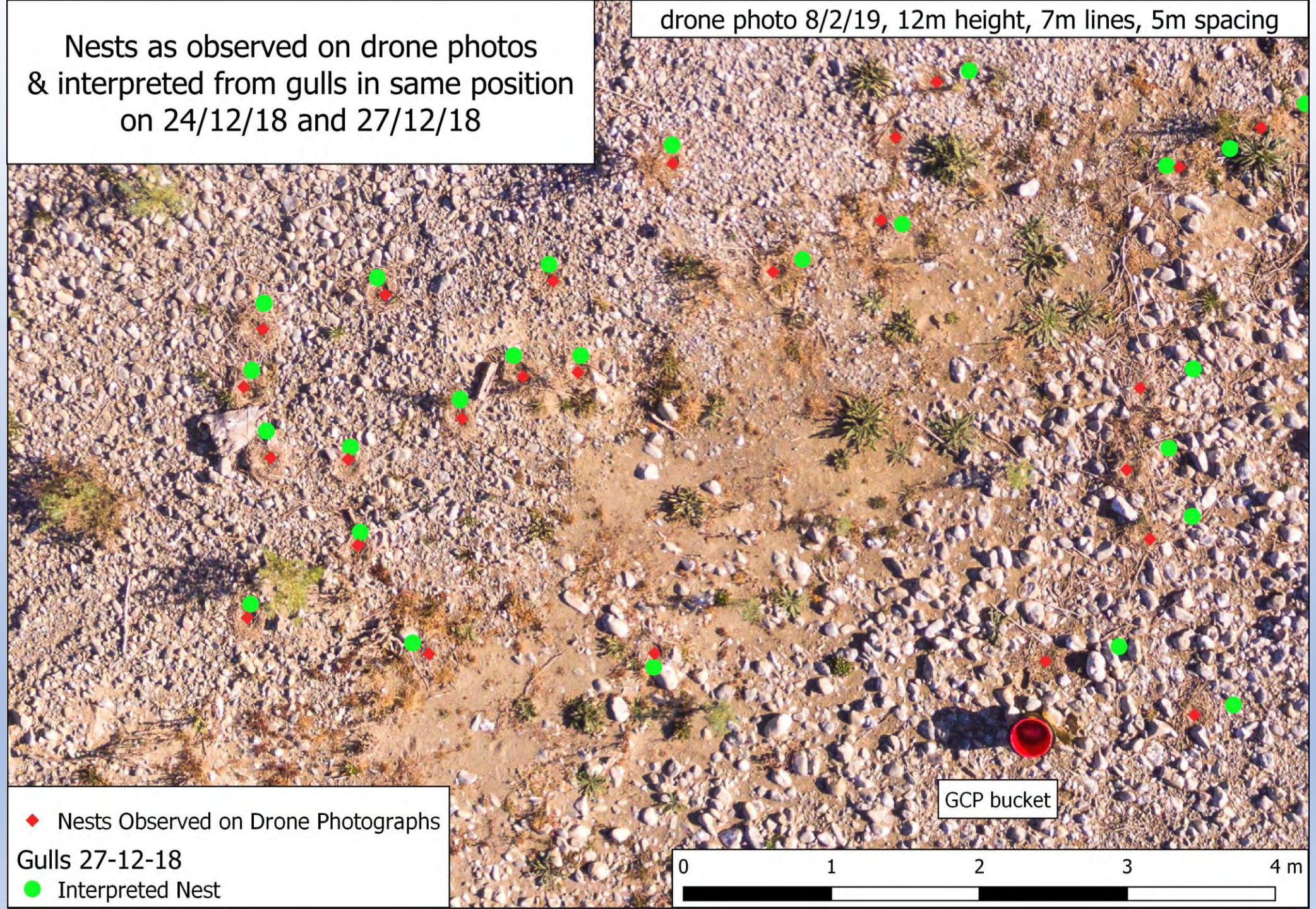
Stitched image in QGIS - no image duplications or offsets seen

24 Dec 2018



Gulls counted in QGIS

24 Dec 2018


Nests as observed on drone photos
& interpreted from gulls in same position
on 24/12/18 and 27/12/18
drone photo 8/2/19, 12m height, 7m lines, 5m spacing
Nests Observed on Drone Photographs
Gulls 27-12-18
Interpreted Nest
GCP bucket
0
1
2
3
4 m

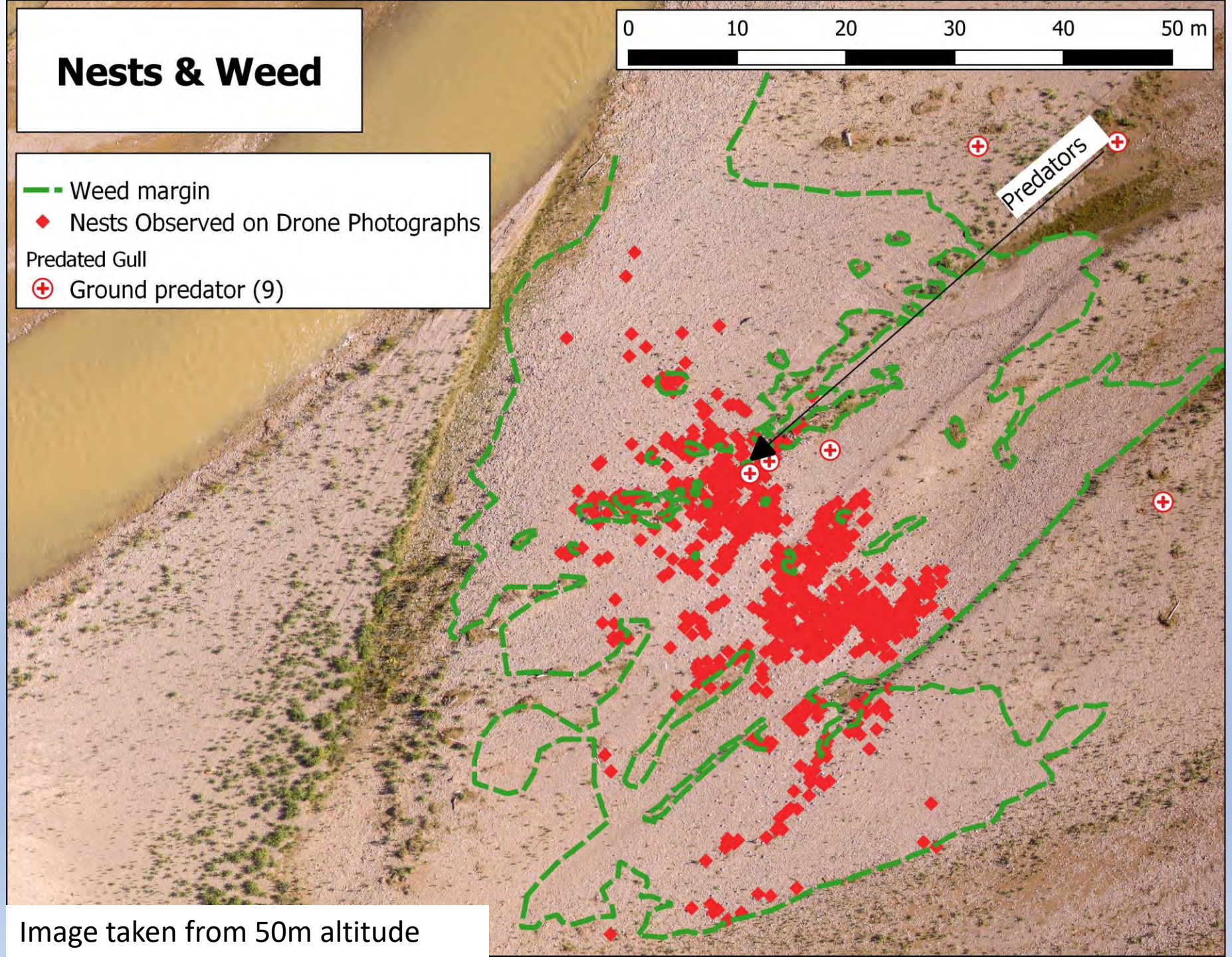
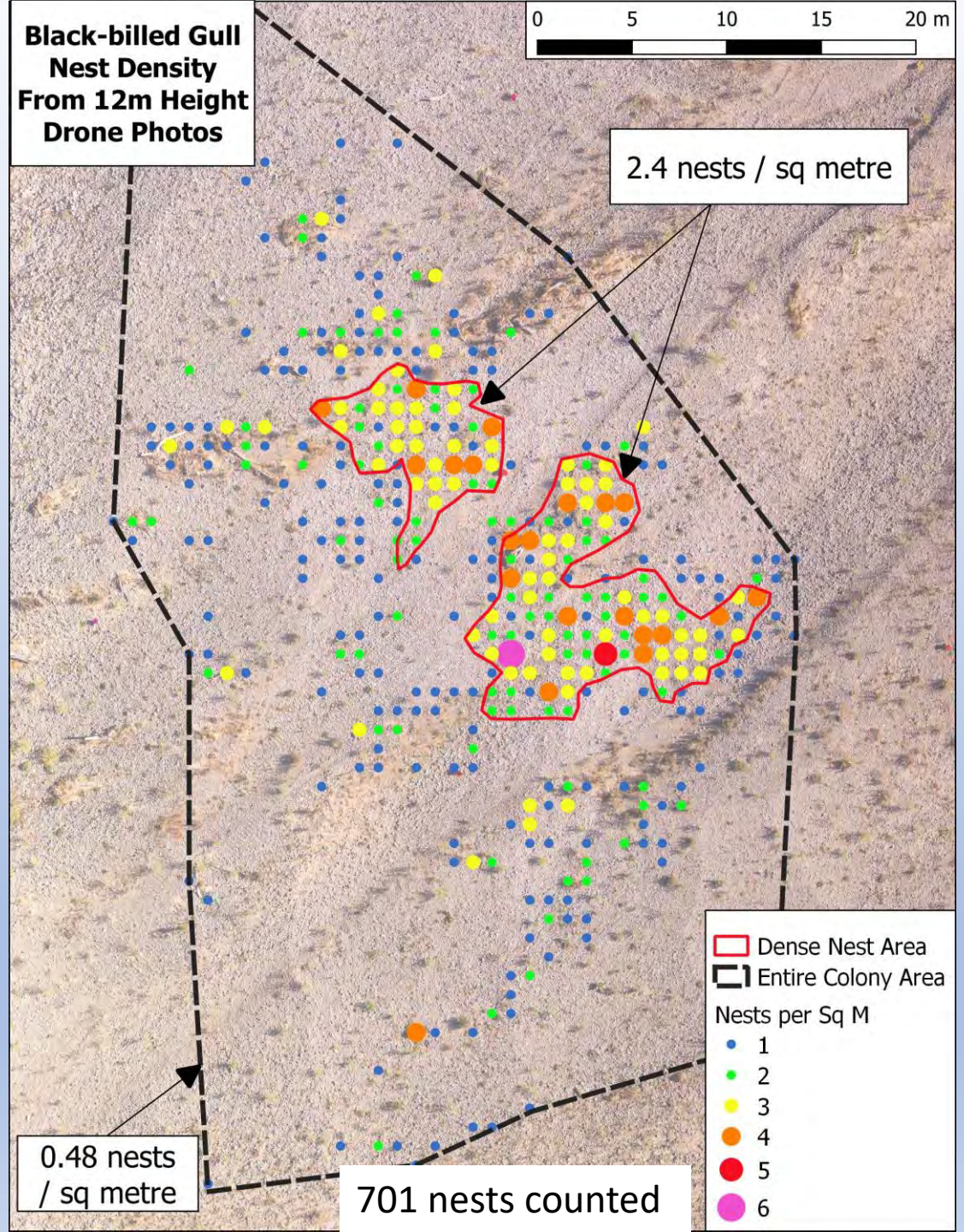
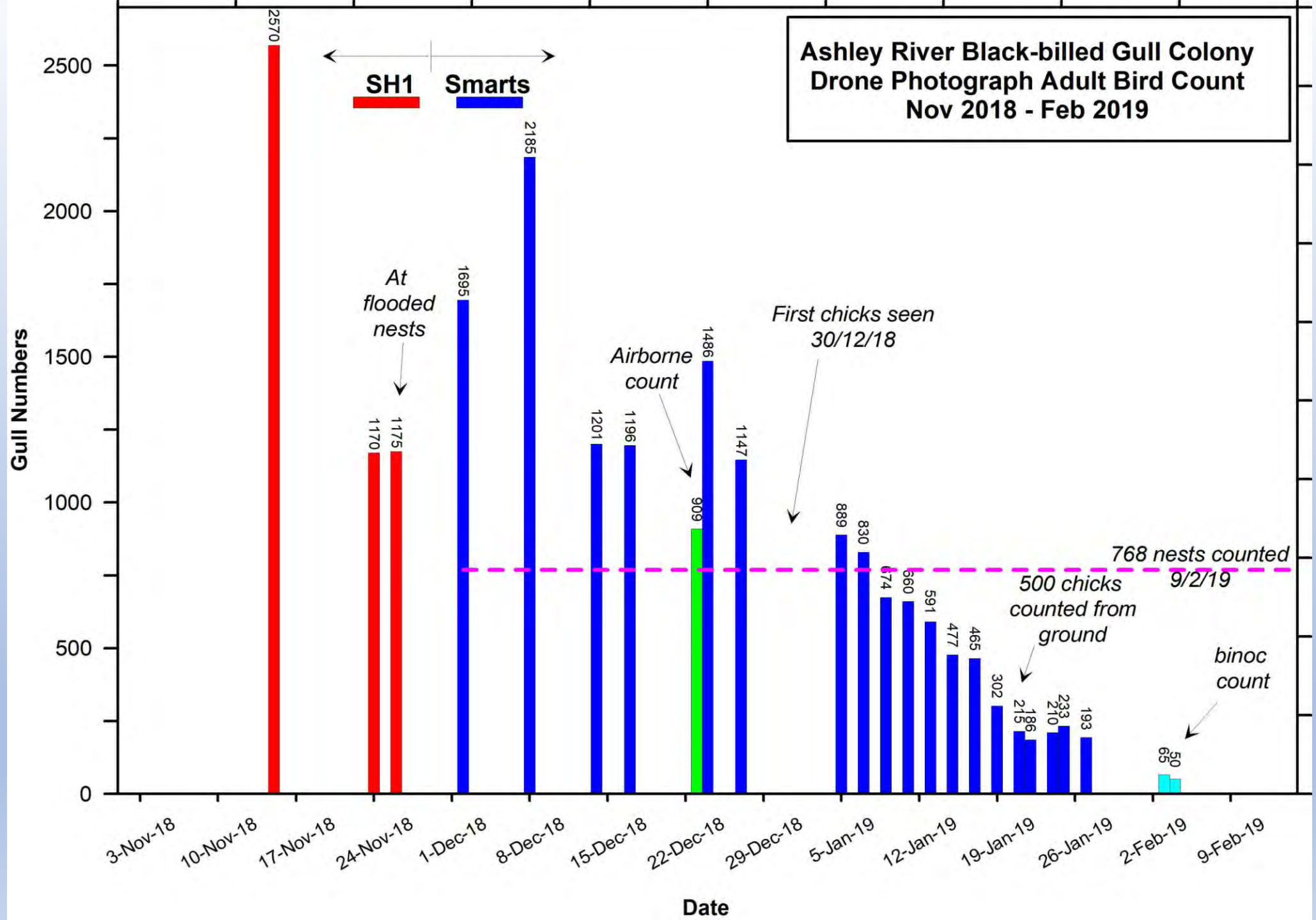


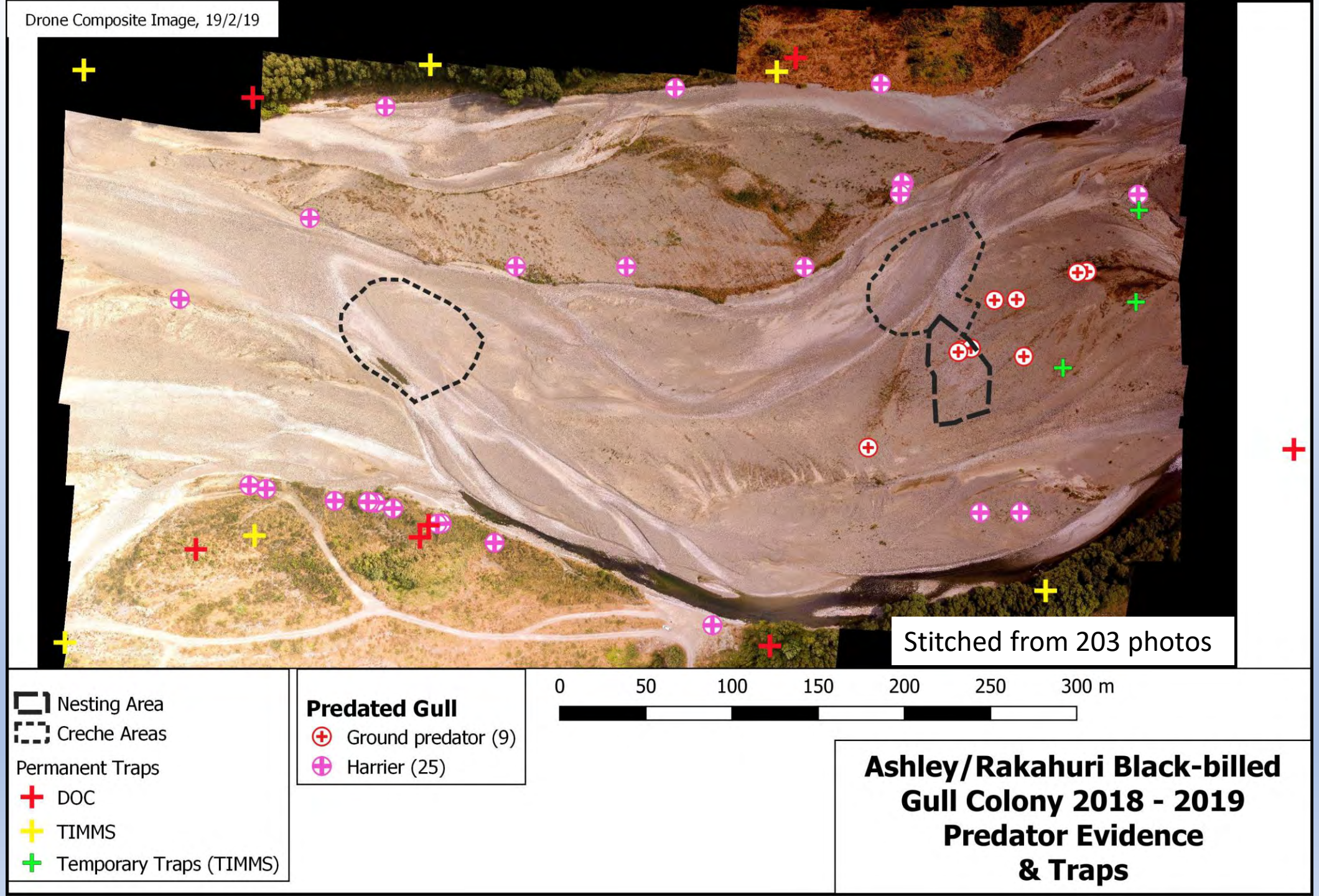
Image taken from 50m altitude


Black-billed Gull
Nest Density
From 12m Height
Drone Photos
0
5
10
15
20 m
2.4 nests / sq metre
0.48 nests
/ sq metre
701 nests counted
Dense Nest Area
Entire Colony Area
Nests per Sq M
1
2
3
4
5
6

768 nests counted

9 Feb 2019

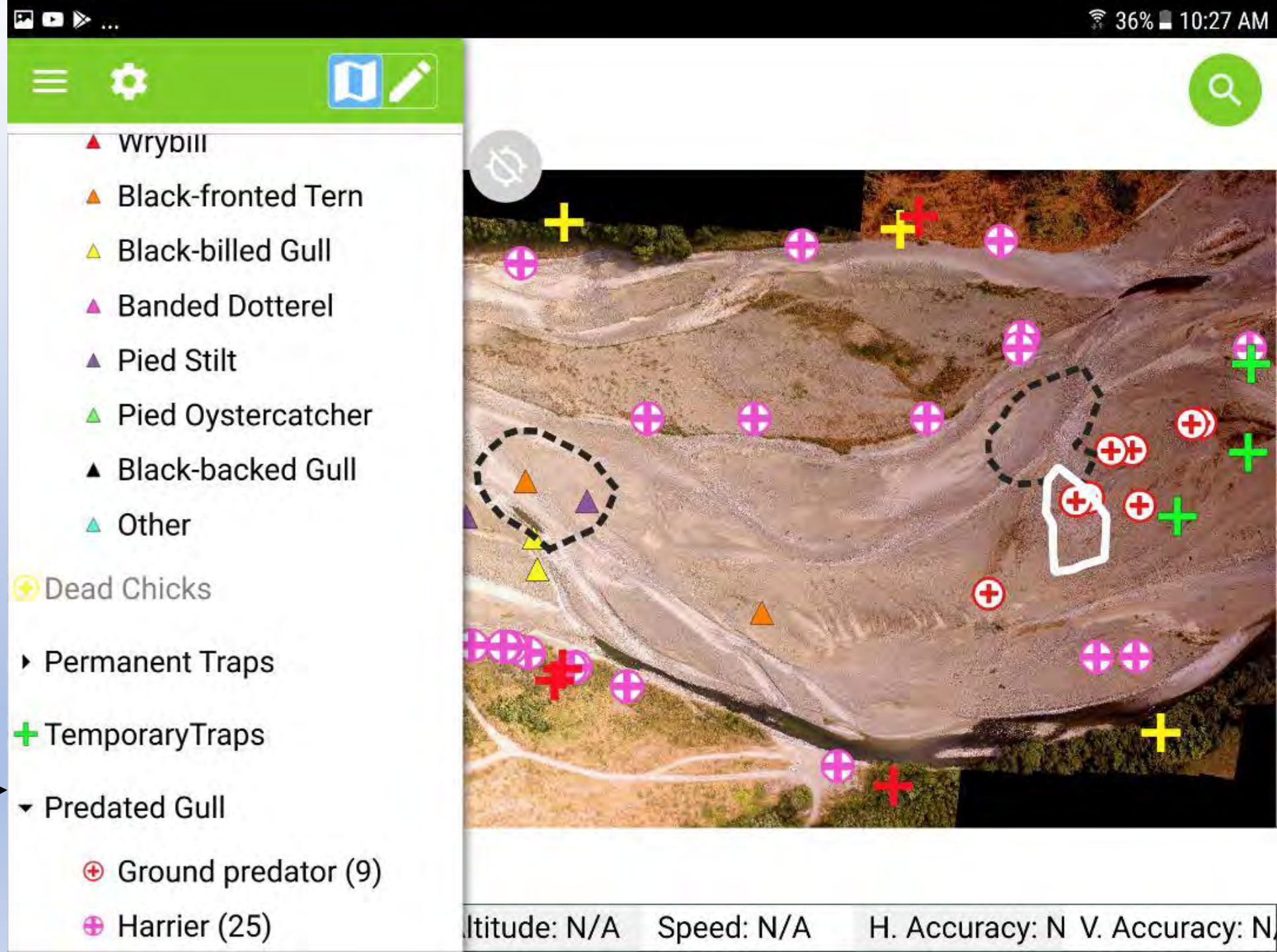

Ashley River Black-billed Gull Colony
Drone Photograph Adult Bird Count
Nov 2018 - Feb 2019
SH1
Smarts
Gull Numbers
Date
0
500
1000
1500
2000
2500
3-Nov-18
10-Nov-18
17-Nov-18
24-Nov-18
1-Dec-18
8-Dec-18
15-Dec-18
22-Dec-18
29-Dec-18
5-Jan-19
12-Jan-19
19-Jan-19
26-Jan-19
2-Feb-19
9-Feb-19
2570
1170
1175
1695
2185
1201
1196
909
1486
1147
889
830
674
660
591
477
465
302
215
186
210
233
193
65
50
At flooded nests
Airborne count
First chicks seen 30/12/18
768 nests counted 9/2/19
500 chicks counted from ground
binoc count


Drone Composite Image, 19/2/19
Stitched from 203 photos
Nesting Area
Creche Areas
Permanent Traps
DOC
TIMMS
Temporary Traps (TIMMS)
Predated Gull
Ground predator (9)
Harrier (25)
0
50
100
150
200
250
300 m
Ashley/Rakahuri Black-billed Gull Colony 2018 - 2019
Predator Evidence & Traps

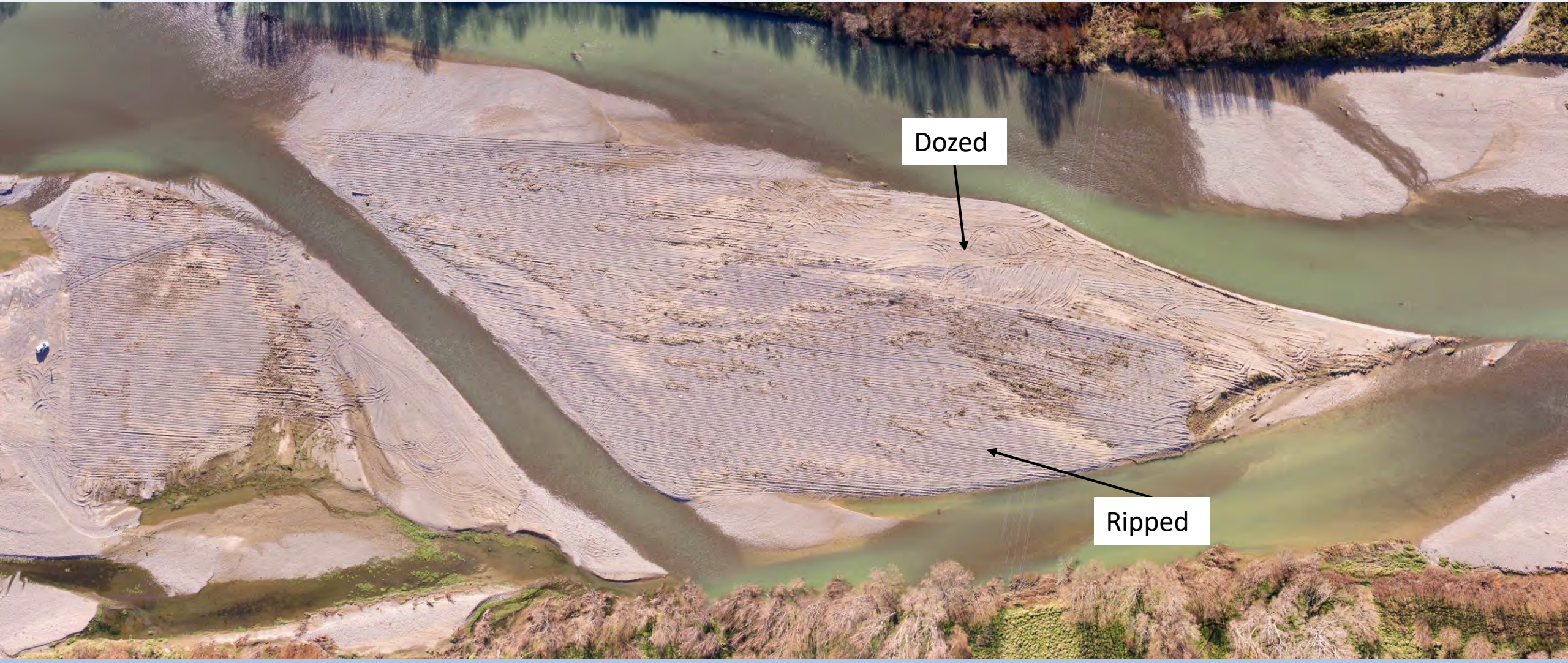
QField

- Free QGIS for Android!
- Set up layers (vector & raster – topo maps, Google Earth images, drone composites) with QGIS and export to tablet
- Map in field with device GPS or Bluetooth GPS

Screenshot

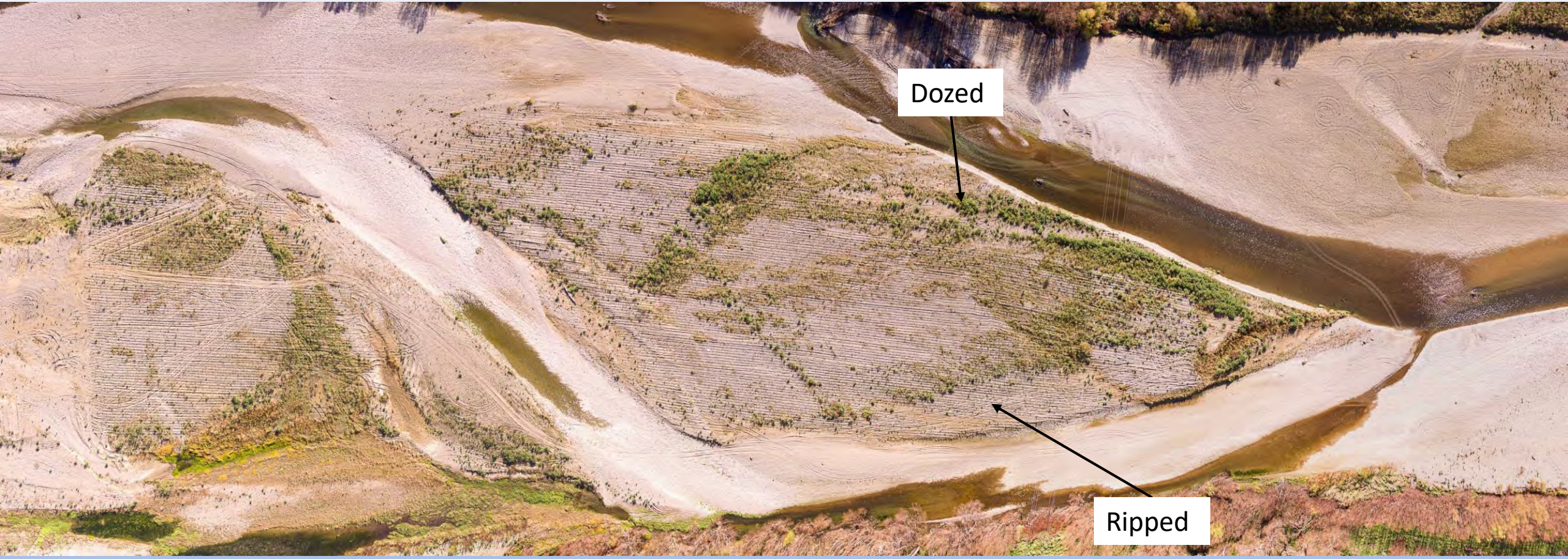


Weed monitoring 1



12/7/18

Weed monitoring 2



20/5/19

Conclusions

- Useful things can be done with a cheap drone, little drone expertise and free or very cheap software
- A survey company could do this a little better, but how far would the $540 spent on hardware go toward surveyor bills?
- Black-billed gulls can be very accurately counted – but gull numbers are difficult to correlate with nest numbers. With a better drone camera, gulls on nests could perhaps be accurately counted.
- Other nesting species can perhaps be counted with a better drone camera and/or lower altitude – next year?