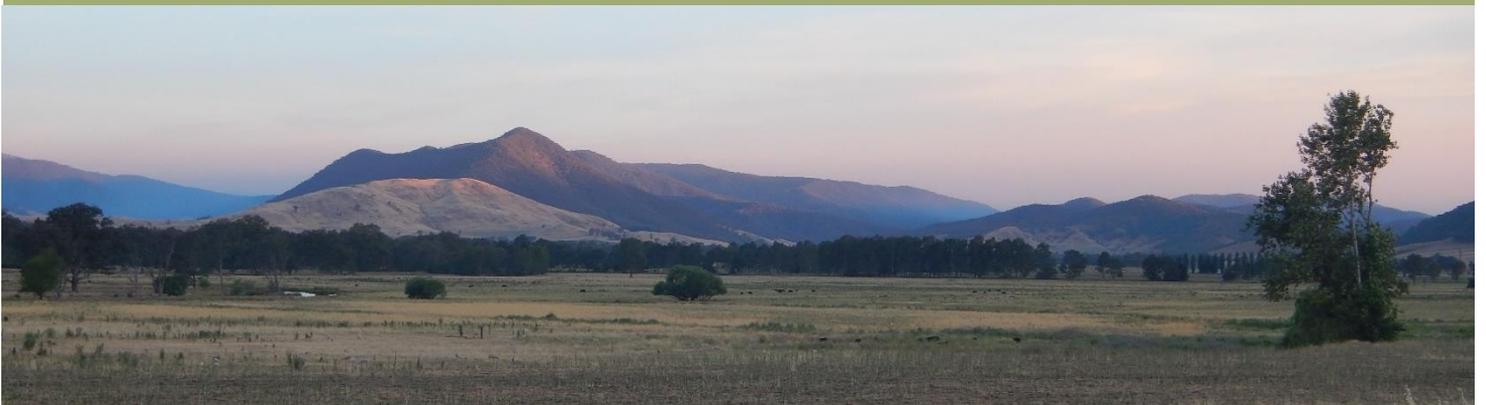
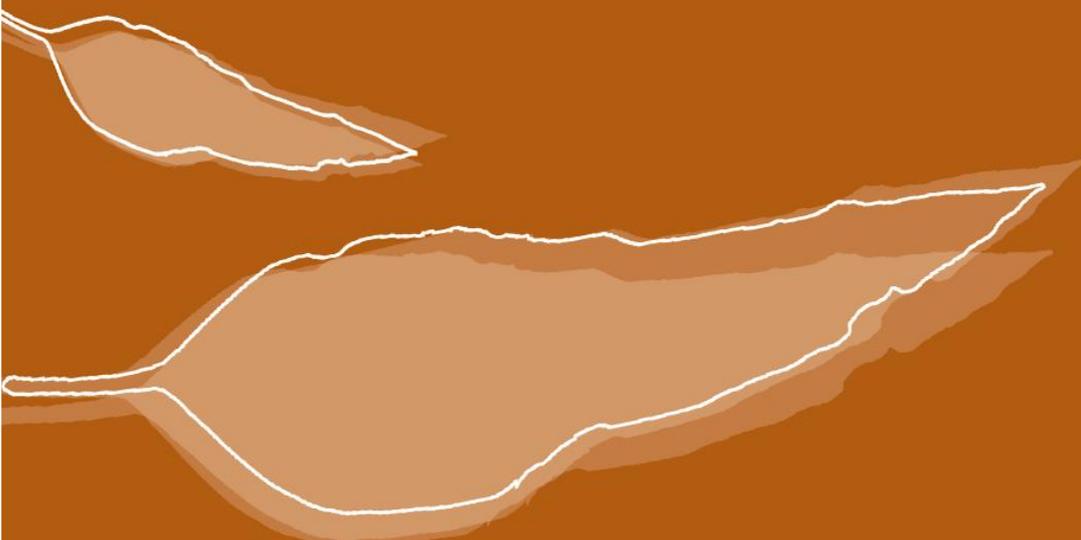




research for a sustainable future



Mitta Valley Landcare
Litoria raniformis surveys
November-December 2019



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Further information:

Anna Turner

Charles Sturt University, PO Box 789,

Albury NSW 2640

Ph: 0499266290 Email: aturner@csu.edu.au



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All research methods were conducted in accordance with Charles Sturt University's Animal Care and Ethics Committee guidelines, approval number: A18033.

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Summary

Frog surveys targeting the Southern Bell frog *Litoria raniformis* were conducted along the Mitta Mitta River during the 2019-20 breeding season (Oct-Dec). Surveys were designed to be a repeat of targeted surveys conducted in 2009 by Ecology Partners Pty. Ltd in which *L. raniformis* were detected at four different sites along the Mitta Mitta River between Tallangatta and Tallandoon (Ecology Partners Pty Ltd, 2010). Recommendations were made for the continuation of monitoring across these sites, however, targeted frog surveys in 2016 did not detect *L. raniformis* (D. Hunter, pers. comm, 2019).

Breeding, and therefore calling, by *Litoria raniformis* is stimulated by rises in water level, most commonly occurring during spring rains. Annual rainfall across most of north-eastern Victoria was in the driest 10 percent of records during 2019, which is likely to have reduced frog calling activity in the region. Smoke from high bushfire activity in the greater region drastically reduced air quality during the second and third survey night of this study.

Although *L. raniformis* was not detected during this study, there is chance that the dry and smoky conditions reduced detectability of this species. Species which were recorded on the most successful survey night (25th Nov 2019) include Peron's Tree frogs (*Litoria peronii*), Eastern Sign Bearing froglet (*Crinia parinsignifera*) and Common Eastern froglet (*Crinia signifera*). Also detected were Spotted Marsh frog (*Limnodynastes tasmaniensis*), Brown tree frog (*Litoria ewingii*), Eastern Banjo frog (*Limnodynastes dumerilli*) and the regionally significant Smooth Toadlet (*Uperoleia laevisgata*).

It is recommended that surveys be repeated in the coming 2020 breeding season (Oct-Dec) in the hope that spring rainfall could stimulate calling and breeding activity and therefore increased chance of detection of *L. raniformis*. It is also highly recommended that local landholders learn to

recognise the call of *Litoria raniformis* and record any observations using Australia Museum's FrogID App.

Introduction

Southern Bell frog monitoring surveys were developed between the Mitta Mitta Valley Landcare and Charles Sturt University's Institute of Land, Water and Society prior to the 2019 Southern Bell frog breeding season in an attempt to detect the endangered frog which has previously inhabited the floodplain.

Project Objectives

The primary aims of the project were to:

- 1) Better understand what frog species inhabit the Mitta Mitta River floodplain system.
- 2) To determine if *Litoria raniformis* are still residing in the region.
- 3) To engage local community in identifying frog species inhabiting their backyard.

Study Area

The Mitta Mitta River is a perennial river and direct tributary of the Murray River within the Murray-Darling Basin. It runs approximately 200 kilometres from Anglers Rest, into Dartmouth dam, then onwards to Tallangatta where it reaches the south-eastern end of the Lake Hume. The river rises below Mount Bogong, the highest mountain in the Victoria Alps, with snow melt attributing to its highest flows in October.

The Mitta Mitta River used to flood on an annual basis, but completion of the Dartmouth Dam in the 1970's largely eliminated the floods. The river starts in near pristine forest until it reaches the flats downstream from Mitta Mitta. From there until Tallangatta, the section of river surveyed during this study, the river

flows through flatter, cleared dairy and beef cattle farming country. This flatter country is dotted with billabongs and anabranches wetlands and farm dams all of which provide important habitat for the resident frog species which once included the Southern Bell frog, *Litoria raniformis*.

Species distribution and Status

Litoria raniformis was once considered widespread and locally abundant throughout south-eastern Australia and Tasmania (Barker et al., 1995). It occupied a range of habitat types which included small permanent wetland systems, streams, dams, irrigation areas and large ephemeral wetlands (Mahoney, 1999; Wassens, 2008).

Litoria raniformis has declined markedly across much of its former range and is now listed as endangered in Victoria (DSE, 2013) and vulnerable nationally (Tyler, 1997). Overall, the species is of national conservation significance and a national recovery plan has been prepared (Clemann & Gillespie, 2012).

Along the Mitta Mitta floodplain *Litoria raniformis* were detected during previous surveys conducted in 2007 (Glen Johnson), 2006 and 2010 (Ecology Partners Pty Ltd, 2008, 2010). A repeat of these surveys in 2016 did not detect any *L. raniformis* activity (D. Hunter, pers. comm, 2019). In 2006/07, *L. raniformis* were detected in eight different waterbodies within the Mitta Mitta River study area. In 2008/09 they were detected in only three of these waterbodies. It is likely that due to drought there was a retraction of suitable sites for the species due to dried-out waterbodies or low water levels unsuitable for breeding.

Methods

During the months of November and December 2019, three nights of frog surveys were conducted between Tallangatta and Mitta Mitta along the Omeo Highway, Mitta North Road and Yabba road. November and

December are the peak calling months for Southern Bell frogs and the most ideal time to detect them should they remain present in the Mitta Mitta Valley. Surveys involved listening for frog calls after dark on nights over 15 degrees Celsius and low winds. Frog species and number of frogs calling was recorded after a five minute listening period. This was done at pre-selected sites based on surveys conducted by Ecology Partners Pty. Ltd in 2010.

Four sites were surveyed along the Mitta North road, twelve sites along the Omeo Highway and fourteen sites on Yabba road (GPS coordinates and maps below). As surveys were conducted by listening to frogs calling from nearby water bodies from the roadside, these sites were where wetlands, farm dams and the Mitta Mitta River were in close proximity to the road. Due to the nature of the valley, on still nights, frog calls can be heard from several kilometres away, allowing for easy detection of any calling species, including the possibility of hearing the endangered Southern Bell Frog, *Litoria raniformis*.

Results

Surveys were conducted on the 25th November, 10 and 19th of December between 21:30 and 1:00. Surveys did not detect the calling of Southern Bell frogs at any of the sites. Species which were heard calling (Figure 1) were Peron's Tree frogs (*Litoria peronii*) (Fig. 2), Eastern Sign Bearing froglet (*Crinia parinsignifera*) and Common Eastern froglet (*Crinia signifera*). Also detected were Spotted Marsh frog (*Limnodynastes tasmaniensis*), Eastern Banjo frog (*Limnodynastes dumerilli*) (Fig. 3) and Brown tree frog (*Litoria ewingii*) (Fig. 4). Two Smooth Toadlets (*Uperoleia laevisgata*) were heard calling at site Om5 and Om6 on the first survey date, 25th November. Smooth Toadlets are regionally significant and were detected during the 2007 surveys by Ecology Partners Pty. Ltd but not the 2008/9 surveys.

Due to high bushfire activity in the greater region, air quality severely decreased during the December surveys. The hot dry and smoky conditions

are likely to have had an impact on frog activity. This was seen in a decrease in the diversity of species observed calling during the December surveys.

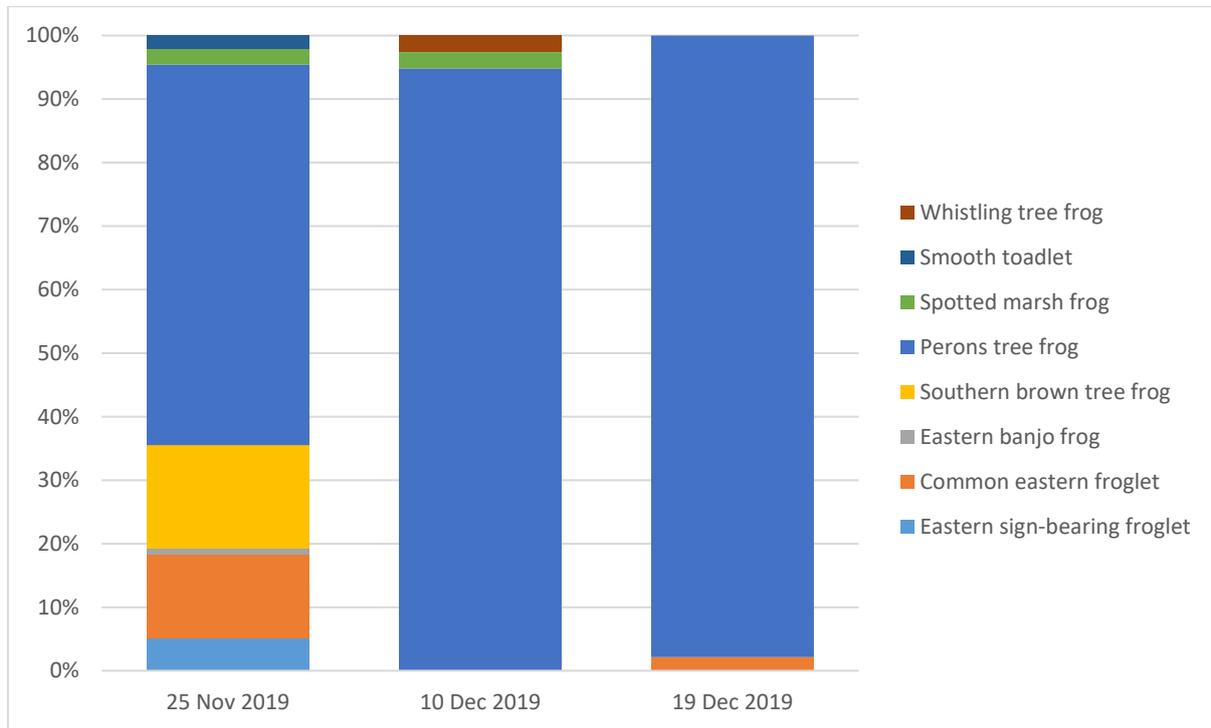


Figure 1- Species detected by survey period



Figure 2- Peron's tree frog (*Litoria peronii*)



Figure 3- Eastern Banjo frog (*Limnodynastes dumerilli*)



Figure 4- Southern brown tree frog (*Litoria ewingii*)

Discussion and Conclusion

Flooding is critical for the long-term persistence of *L. raniformis* as well as the health of the Mitta Mitta floodplain (Schultz, 2007). The many ephemeral off-stream waterbodies along the Mitta Mitta River, such as billabongs, typically only fill after a flooding event. Flooding events can either be natural or from the release of water from Dartmouth Reservoir. Billabongs are likely to be used by *L. raniformis* during flood periods as breeding habitat.

Total rainfall for the year across Victoria was below the long-term average. Most of Gippsland, northern and north-eastern districts had annual rainfall

totals in the driest 10 per cent of records. Victoria's rainfall in 2019 was about 28% below average, drier than 2018 and much drier than 2017 (Commonwealth of Australia 2020, Bureau of Meteorology). The dry conditions as experienced by the region prior to these surveys (2018 and 2019) are likely to have impacted numerous frog species dependent on aquatic habitats for their survival. Similar patterns of decreased frog numbers were seen between the 2006 and 2008 surveys conducted by Ecology Partners Pty. Ltd. Monitoring such as this helps to better understand species response to current environmental conditions and guide management decisions for breeding a habitat refuge, not just for *L. raniformis* but all frog species in the region.

Amphibian Chytrid Fungus

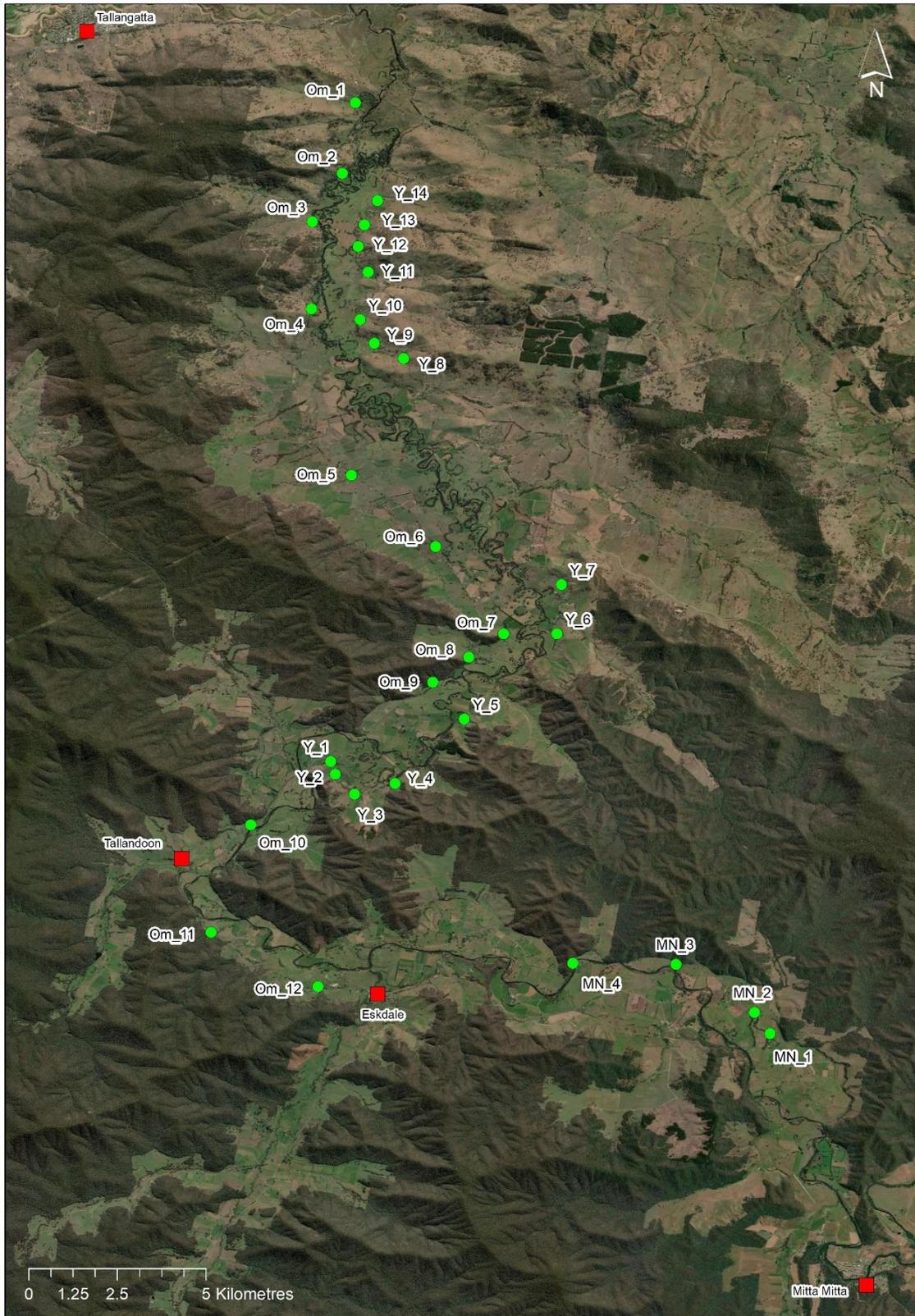
Amphibian chytrid fungus, causes a disease called chytridiomycosis in frogs which has led to mass fatalities globally (Berger et al., 1998). Since its discovery in 1998, chytrid has been detected in more than 500 amphibian species and occurs in at least 52 different countries (Scheele et al., 2019). Currently, 62 out of 242 native amphibians in Australia have been detected with chytrid (Murray et al., 2010b). The chytrid fungus, *Batrachochytrium dendrobatidis* (Bd), is sensitive to temperature. Over 28°C is lethal to the aquatic fungus, therefore population declines have mainly occurred in cooler regions Australia wide (Piotrowski et al., 2004; Murray et al., 2010a). The Southern Bell frog has been found infected with this fungus (Heard et al., 2014) and along with habitat fragmentation, introduced fish, agricultural practices, change in water flows, it is likely to have caused declines in numbers across its entire range, including populations of the Mitta Mitta Valley.

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Figures

Figure 1: Survey Sites



Appendices

Appendix 1: Surveys Sites

Site Name	GPS Latitude	GPS Longitude
MN_1	-36.474215	147.350366
MN_2	-36.468779	147.34643
MN_3	-36.456499	147.326501
MN_4	-36.45622	147.300334
Om_1	-36.236175	147.245153
Om_2	-36.254204	147.241864
Om_3	-36.266568	147.234248
Om_4	-36.288903	147.233995
Om_5	-36.331388	147.244145
Om_6	-36.349712	147.265476
Om_7	-36.371963	147.282755
Om_8	-36.377956	147.273896
Om_9	-36.384391	147.264788
Om_10	-36.42081	147.21857
Om_11	-36.44831	147.2085
Om_12	-36.462216	147.23563
Y_1	-36.404615	147.238907
Y_2	-36.407849	147.240037
Y_3	-36.412981	147.24491
Y_4	-36.410223	147.255183
Y_5	-36.393787	147.272802
Y_6	-36.371966	147.296305
Y_7	-36.359368	147.297455
Y_8	-36.301526	147.257395
Y_9	-36.297676	147.250002
Y_10	-36.291655	147.246335
Y_11	-36.279448	147.24839
Y_12	-36.272952	147.245894
Y_13	-36.267398	147.247437
Y_14	-36.261198	147.250758

Appendix 2- Survey details

Survey Number	Survey Date	Start Time	Start Temperature (°C)	Finish Temperature (°C)	Humidity (%)	Wind Speed (km/h)	Wind Direction	Moon Phase	Cloud Cover (%)	Other
1	25/11/2019	21:00	20.04	18.01	34.25	0	0	New moon	0	Still night
2	10/12/2019	21:18	22.8	19.4	49.2	17	SE	Full moon	10	Smoky from bushfires, wind died down further down valley
3	19/12/2019	21:22	28	25	31.6	1	SE	Half moon	0	Smoke cleared, really hot week, had been smoky earlier in week

Appendix 3- Species counts by site

Site Name	Eastern sign-bearing froglet	Common eastern froglet	Eastern banjo frog	Southern brown tree frog	Peron's tree frog	Spotted marsh frog	Smooth Toadlet	Whistling tree frog	Grand Total
MN_1		5		5	12				22
MN_2		10		10	15				35
MN_4		5			2			3	10
Om_1					20				20
Om_2		3		1	8				12
Om_3	2				12				14
Om_4					14				14
Om_5	2					6	2		10
Om_6	2		2		16	2	2		24
Om_7					6				6
Om_8					7				7
Om_9					21				21
Om_10					5				5
Om_11				2	10				12
Om_12		5		2	11				18
Y_1					20				20
Y_2					12				12
Y_3					10				10
Y_4				10	25				35
Y_5				2	23				25
Y_6					10				10
Y_7					7				7
Y_8	2				11				13
Y_9	2				5				7
Y_10					13				13

Y_11					3				3
Y_12					7				7
Y_13					6				6
Y_14					8				8
Grand Total	10	28	2	32	319	8	4	3	406