PROJECT "W"

FIRST JUMP

Project Coordinator: Katia Sae
Research Team: Mason Akiwa, Josca Aldent, Forcha Alendare, Mirielle Asaki, Ozob Bozo, Andrew Chikatilo, Delaine De'Andre, Mushroom Greene, Stikkem Innagibblies, Kobura Juraxxis, Saile Litestrider, Ashlar Maidstone, Dungeon Manager, Mark726, Mynxee, Jen Outamon, Aiken Paru, Pileto, Zecht Reddas, Dorian Reu, Johnny Splunk, Dr Zemph

WHAT IS PROJECT "W"

- Myself and others have observed over time while wandering wormhole space in the New Eden cluster, that there seems to be some pattern to the "randomness" of wormhole connections. Project "W" was created to collect observational data while navigating wormhole connections.

- From April of yc118 to the end of June yc118 (2016), observations were collected which included information about the originating system, the signature connection, and the destination.

- This was intended to be an initial study to determine if further investigation and data collection was warranted should any anomalies be found.

- The null hypothesis is: Based on region, wormholes should be randomly connecting to other regions of space within the known expected distribution by type to the destination region using a significance level of 0.05

OBSERVED CONNECTIONS & DOING THE ANALYSIS

- Total of 663 connections observed

  - 300 connections via known wormhole types

  - 363 connections of K162 (exit) or unknown wormholes (types that were not recorded).

- Chi-Square Goodness of Fit test selected for first pass on observed connections.

  - Good statistical method for categorized data to assess if the observed distribution is a good fit to the expected distribution.

  - Appropriate test when the following conditions are met:

    - Sampling method is simple random sampling. Our observed connections are equally likely to occur in our expected destination population (Regions). Passed.

    - Our variable under study (connection type) is categorical (Regions). Passed.

    - The expected value of the number of sample connections in each level of the variable is at least 5. Failed. More data collection necessary to prove research results. We'll still take a look, however, to see if it's worth the effort.

THE SPECIAL W-SPACE CLASS & REGIONS

- The following wormhole classes are excluded from this analysis

    - Class 12 Region G-R00031 is Thera and contains only the one region and one system

    - Class 13 Region H-R00032 is the twenty-five frigate sized accessible systems and are only in the one region

    - Classes 14, 15, 16, 17, and 18 Region K-R00033 are the five Drifter wormholes and are only in the one region

DETERMINING THE EXPECTED

- Knowing the signature type, we know the space the destination resides in. For example, a signature type of E004 connects to a Class 1 wormhole.

- We know classes of wormholes contain specific regions. Sticking with our Class 1 wormhole, that would be Regions 1, 2, 3, and A-R00001.

- There are a total of 358 systems in Class 1 wormhole space. The expected chance of landing in a specific region will be determined by the number of systems in each region divided by the total number of systems for that class.

Class	Region	Systems	Expected
Class 1	Region 1	133	37.2%
	Region 2	153	42.7%
	Region 3	62	17.3%
	A-R00001	10	2.8%
		358	100.0%

K-SPACE EXPECTED DISTRIBUTION BY SEC/REGION

A641 B274 B449 B520 D792 D845 N110 Q063 S047   A239 C140 C391 J244 N290 N944 R051 U210 V898   C248 E545 E587 K329 K346 Q003 S199 V283 Z060 Z142

High Sec	Systems	Expected
Aridia	5	0.5%
Black Rise	7	0.6%
Derelik	55	5.0%
Devoid	30	2.8%
Domain	138	12.7%
Essence	40	3.7%
Everyshore	45	4.1%
Genesis	34	3.1%
Heimatar	55	5.0%
Kador	61	5.6%
Khanid	41	3.8%
Kor-Azor	30	2.8%
Lonetrek	69	6.3%
Metropolis	101	9.3%
Molden Heath	9	0.8%
Placid	14	1.3%
Sinq Laison	73	6.7%
Solitude	20	1.8%
Tash-Murkon	87	8.0%
The Bleak Lands	13	1.2%
The Citadel	62	5.7%
The Forge	68	6.2%
Verge Vendor	33	3.0%
	1,090	100.0%

Low Sec	Systems	Expected
Aridia	75	9.2%
Black Rise	42	5.1%
Derelik	63	7.7%
Devoid	22	2.7%
Domain	54	6.6%
Essence	27	3.3%
Everyshore	9	1.1%
Genesis	69	8.4%
Heimatar	28	3.4%
Kador	24	2.9%
Khanid	43	5.3%
Kor-Azor	31	3.8%
Lonetrek	29	3.5%
Metropolis	58	7.1%
Molden Heath	29	3.5%
Placid	57	7.0%
Sinq Laison	36	4.4%
Solitude	23	2.8%
Tash-Murkon	16	2.0%
The Bleak Lands	22	2.7%
The Citadel	24	2.9%
The Forge	25	3.1%
Verge Vendor	11	1.3%
	817	100.0%

Null Sec	Systems	Expected	Null Sec	Systems	Expected
Branch	94	2.9%	Omist	43	1.3%
Cache	44	1.3%	Outer Passage	88	2.7%
Catch	108	3.3%	Outer Ring	59	1.8%
Cloud Ring	40	1.2%	Paragon Soul	39	1.2%
Cobalt Edge	69	2.1%	Period Basis	40	1.2%
Curse	50	1.5%	Perrigen Falls	104	3.2%
Deklein	68	2.1%	Providence	84	2.6%
Delve	97	2.9%	Pure Blind	85	2.6%
Detorid	96	2.9%	Querious	95	2.9%
Esoteria	85	2.6%	Scalding Pass	81	2.5%
Etherium Reach	100	3.0%	Stain	132	4.0%
Fade	27	0.8%	Syndicate	106	3.2%
Feythabolis	89	2.7%	Tenal	68	2.1%
Fountain	115	3.5%	Tenerifis	81	2.5%
Geminate	84	2.6%	The Kalevala Expanse	69	2.1%
Great Wildlands	101	3.1%	The Spire	72	2.2%
Immensea	84	2.6%	Tribute	54	1.6%
Impass	51	1.5%	Vale of the Silent	118	3.6%
Insmother	110	3.3%	Venal	95	2.9%
Malpais	102	3.1%	Wicked Creek	82	2.5%
Oasa	85	2.6%		3,294	100.0%

W-SPACE EXPECTED DISTRIBUTION BY CLASS/REGION

| E004 | H121 | P060 | Q317 | V301 | Y790 | Z647 | Z971 |

Class	Region	Systems	Expected
Class 1	Region 1	133	37.2%
	Region 2	153	42.7%
	Region 3	62	17.3%
	A-R00001	10	2.8%
		358	100.0%

| C125 | D364 | D382 | G024 | I182 | L005 | N766 | R943 |

Class	Region	Systems	Expected
Class 2	Region 4	104	19.4%
	Region 5	102	19.0%
	Region 6	141	26.3%
	Region 7	50	9.3%
	Region 8	128	23.8%
	B-R00004	12	2.2%
		537	100.0%

| C247 | L477 | M267 | N968 | O477 | O883 | X702 | Z006 |

Class	Region	Systems	Expected
Class 3	Region 9	56	11.1%
	Region 10	51	10.1%
	Region 11	86	17.0%
	Region 12	105	20.8%
	Region 13	43	8.5%
	Region 14	96	19.0%
	Region 15	58	11.5%
	C-R00009	11	2.2%
		506	100.0%

| E175 | M001 | M609 | O128 | T405 | X877 | Y683 | Z457 |

Class	Region	Systems	Expected
Class 4	Region 16	60	11.5%
	Region 17	25	4.8%
	Region 18	46	8.8%
	Region 19	94	18.0%
	Region 20	50	9.6%
	Region 21	115	22.0%
	Region 22	87	16.6%
	Region 23	28	5.4%
	D-R00016	18	3.4%
		523	100.0%

| C008 | H296 | H900 | L614 | M555 | N062 | N432 | N770 | V911 |

Class	Region	Systems	Expected
Class 5	Region 24	91	17.1%
	Region 25	100	18.8%
	Region 26	68	12.8%
	Region 27	71	13.4%
	Region 28	92	17.3%
	Region 29	90	16.9%
	E-R00024	19	3.6%
		531	100.0%

| A982 | B041 | G008 | R474 | S804 | U319 | U574 | V753 | W237 |

Class	Region	Systems	Expected
Class 6	Region 30	113	95.8%
	F-R00030	5	4.2%
		118	100.0%

CLASS 1 CHI-SQUARE GOODNESS OF FIT TEST

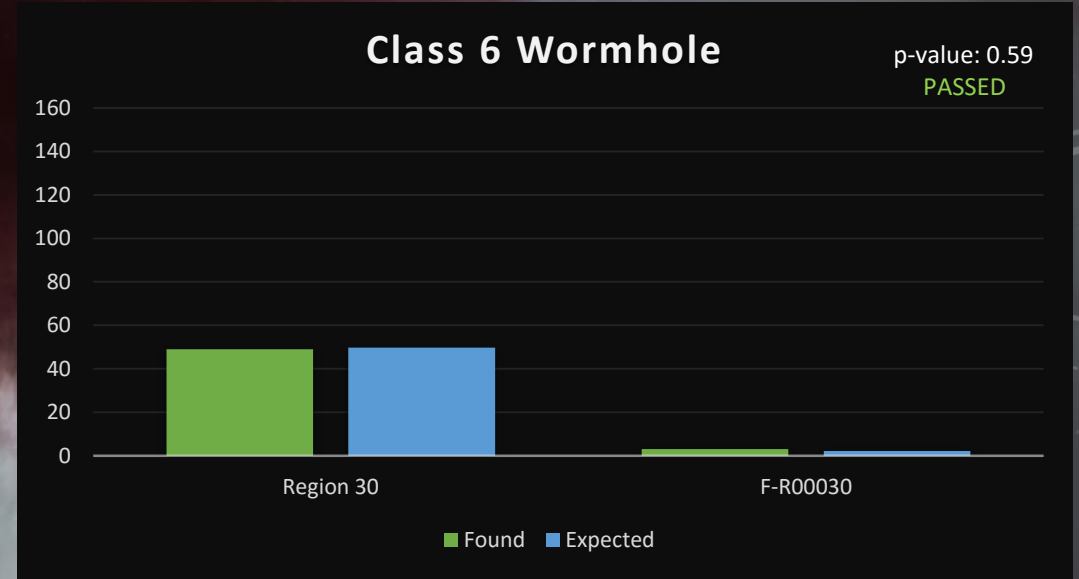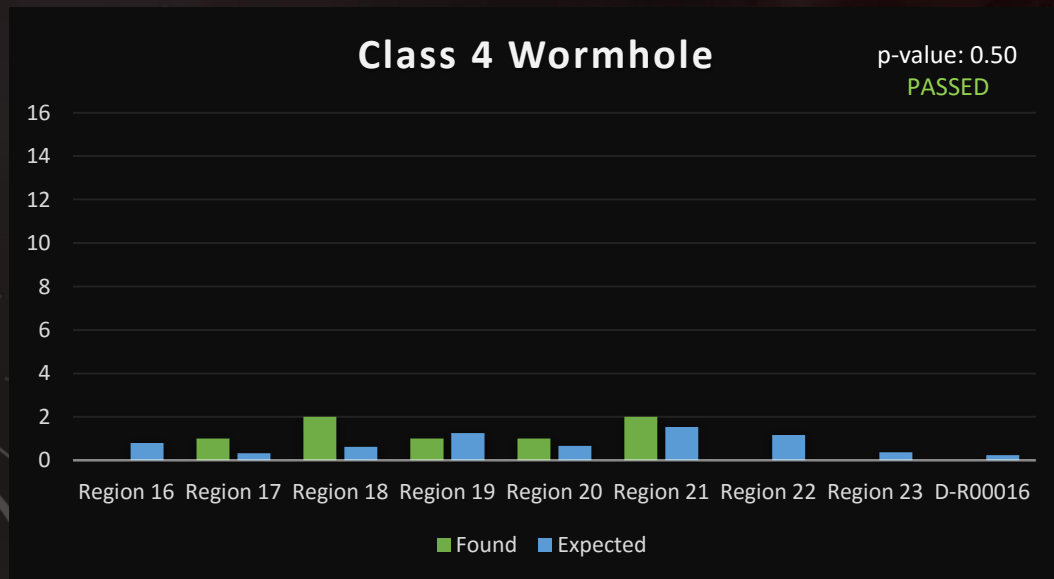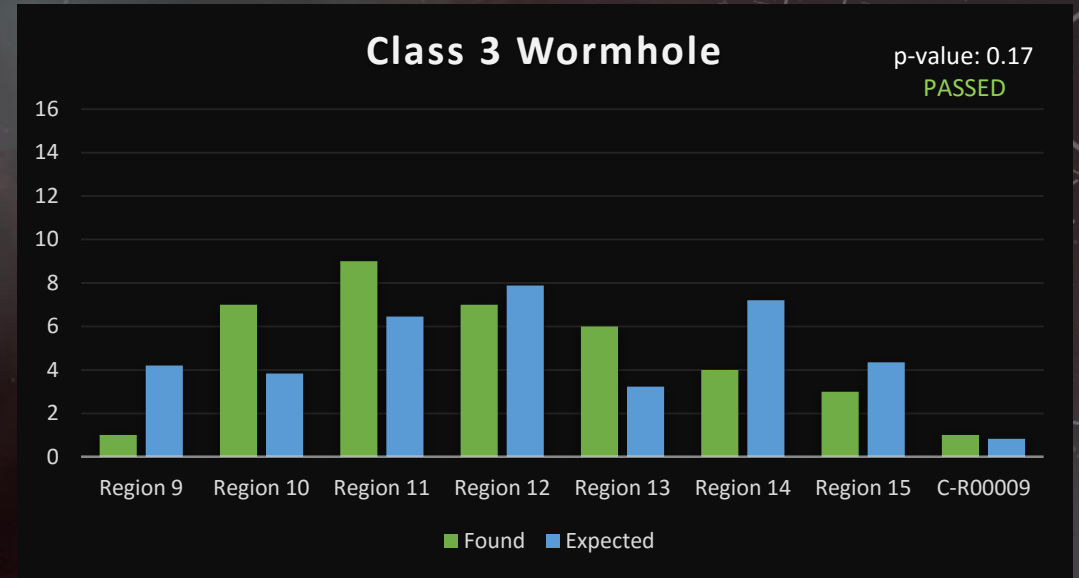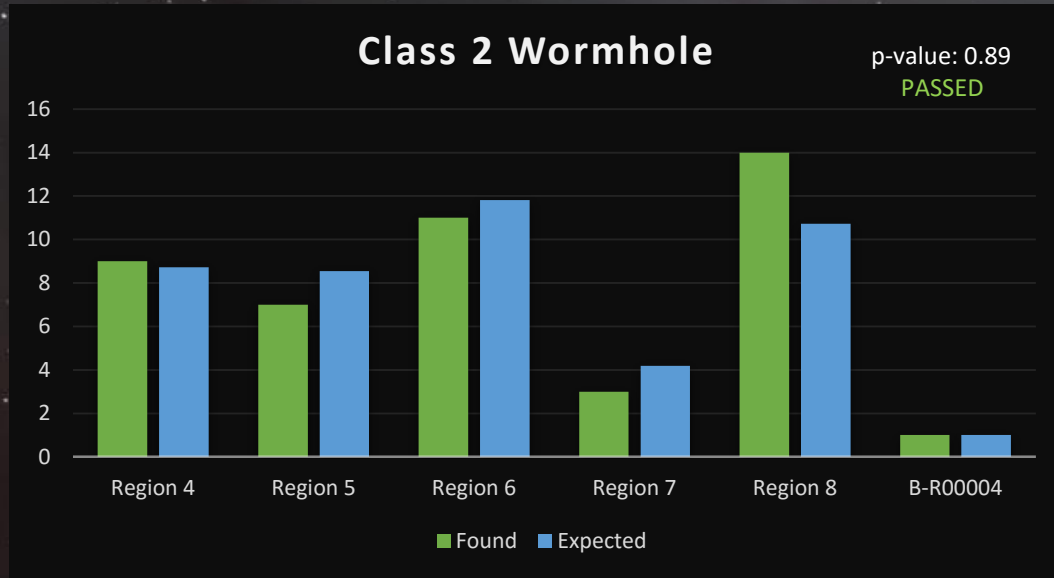| Region	Found	Expected	Chi-Sq	p-value
Region 1	13	13.37	0.010475	.99
Region 2	15	15.39	0.009658	
Region 3	7	6.23	0.093956	
A-R00001	1	1.01	3.1E-05	
	36	36	0.11412	

NOTE: Region A-R00001 expected observations less than 5. Failed to meet Chi-Square test conditions.

Class	Region	Systems	Expected
Class 1	Region 1	133	37.2%
	Region 2	153	42.7%
	Region 3	62	17.3%
	A-R00001	10	2.8%
		358	100.0%

Class 1 Wormhole — p-value: 0.99 — PASSED. Bar chart of Found (green) vs Expected (blue) across Region 1, Region 2, Region 3, A-R00001.

Since the p-value of 0.99 is greater than the significance level of 0.05, we accept the null hypothesis.
The observed distribution is from the same population as the expected distribution.
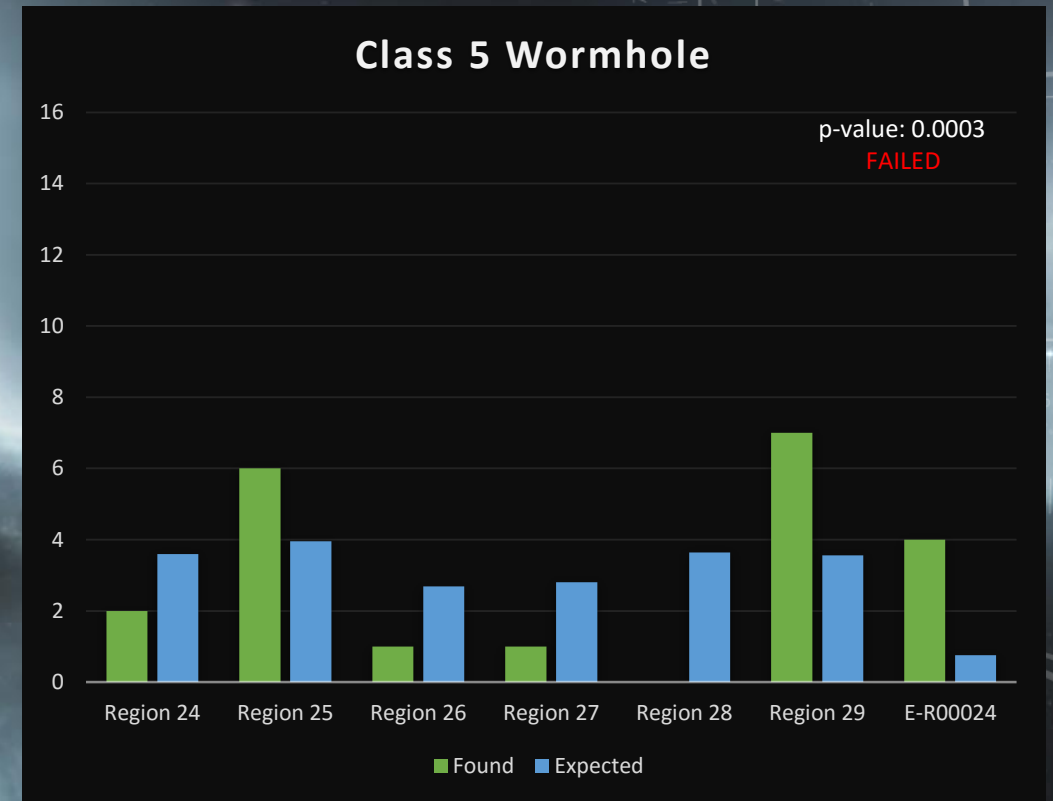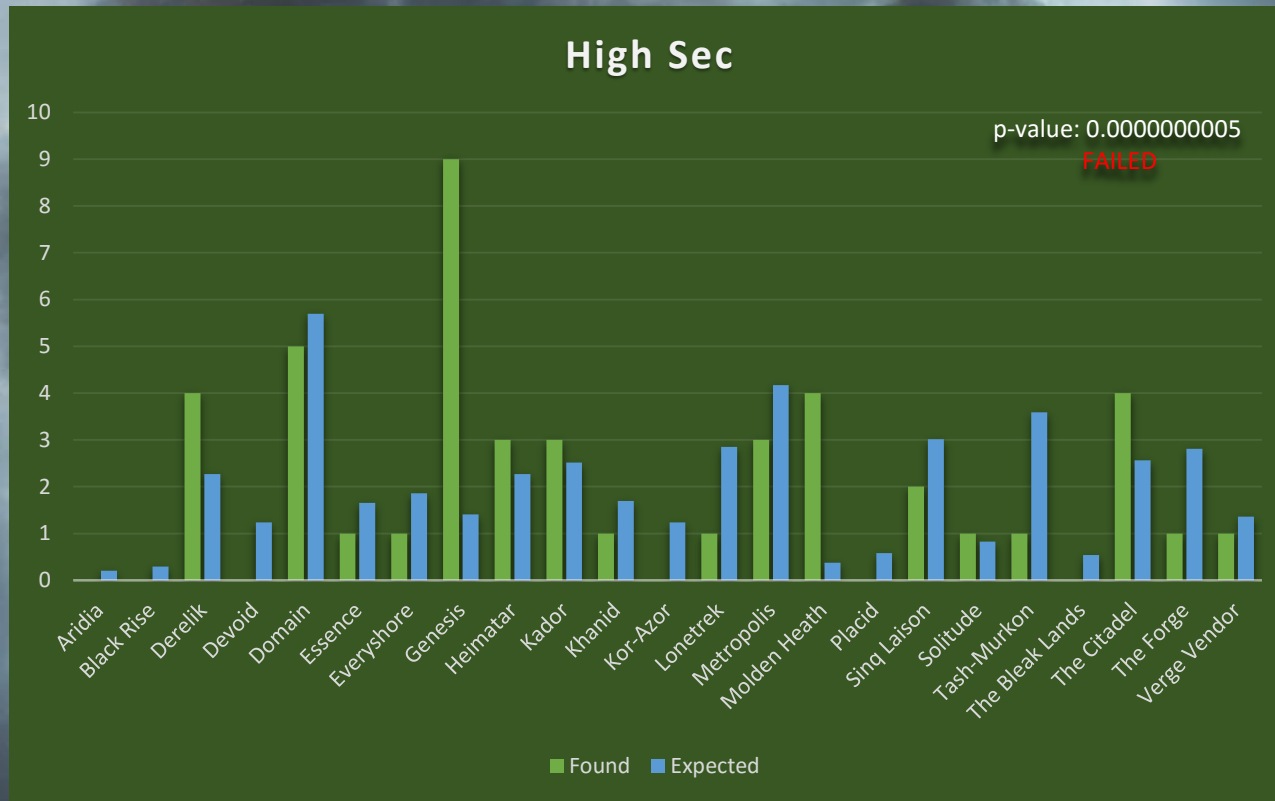TLDR: Class 1 wormhole connections are equally random.

WHAT ABOUT THE OTHER WORMHOLE CLASSES?
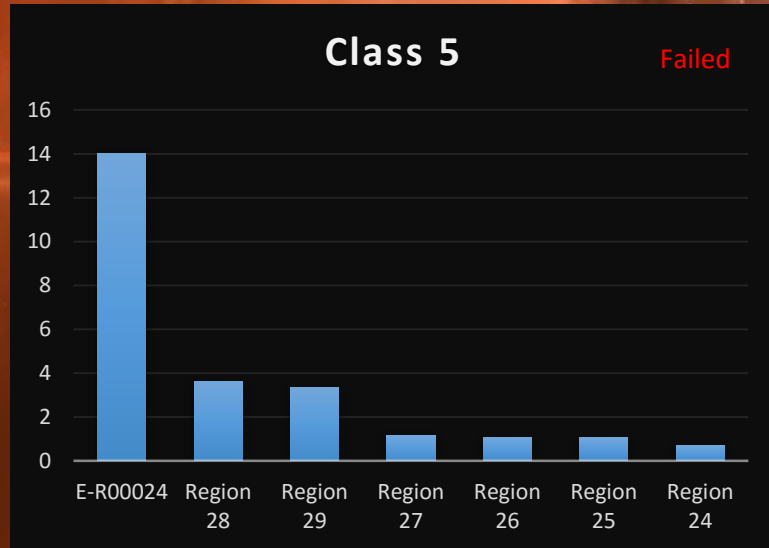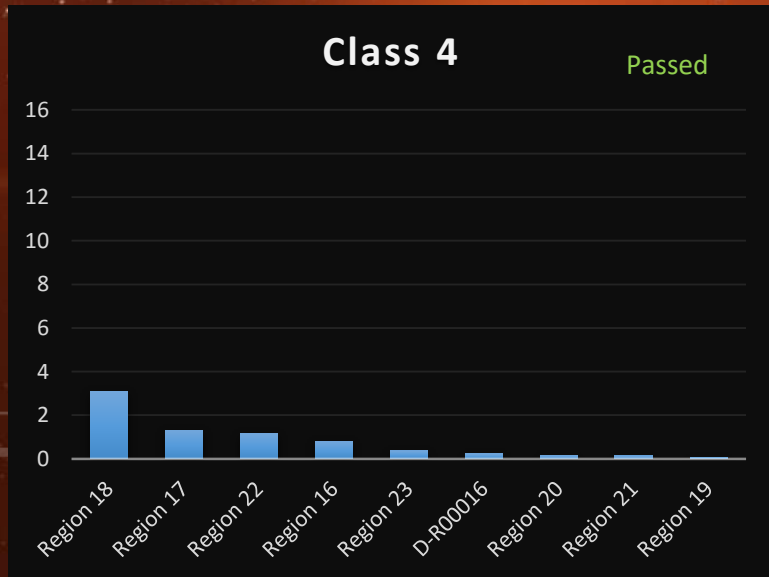
AND KNOWN SPACE…

WHO'S MISSING… ?

High Sec

p-value: 0.0000000005
FAILED

■ Found ■ Expected

Class 5 Wormhole

p-value: 0.0003
FAILED

Region 24 Region 25 Region 26 Region 27 Region 28 Region 29 E-R00024

■ Found ■ Expected
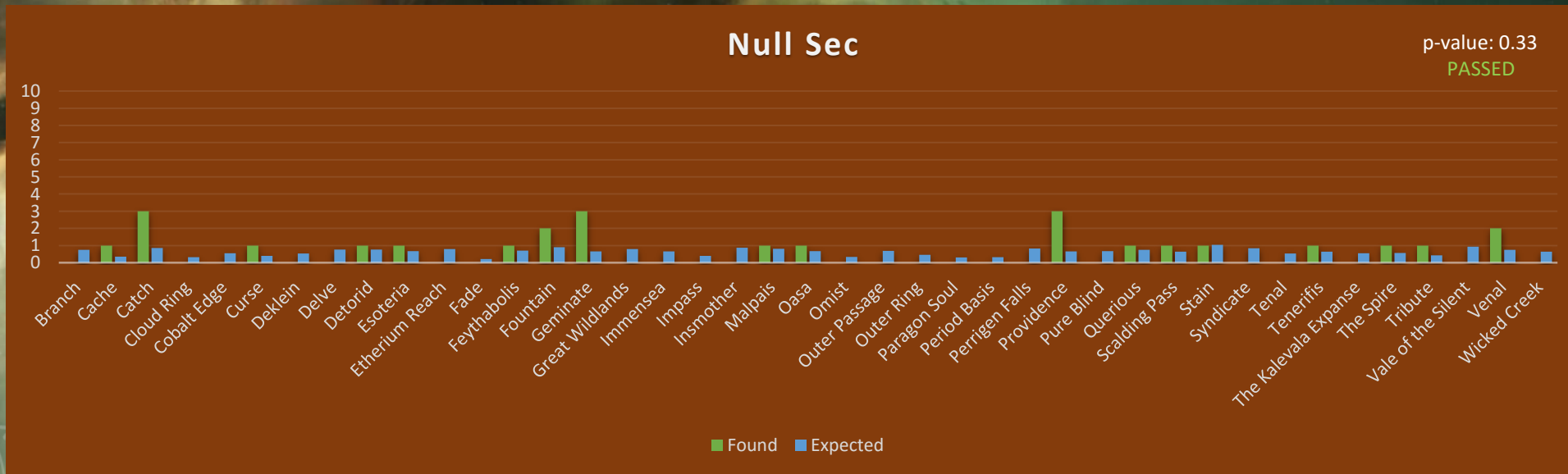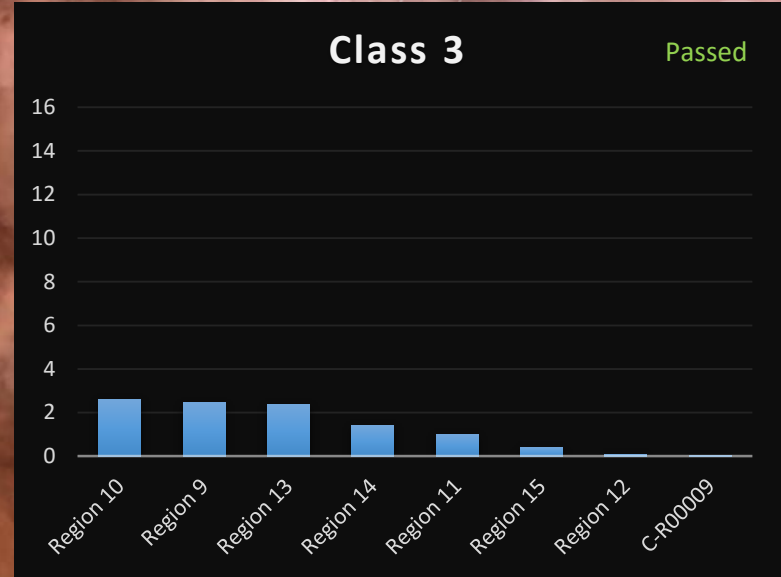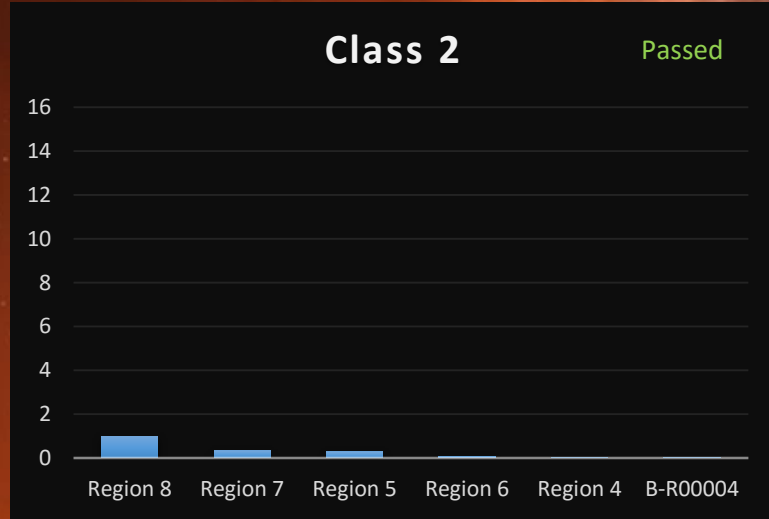
Since the p-values are less than the significance level of 0.05, we reject the null hypothesis.
The observed distribution is different from the population's expected distribution.
TLDR: Connections to High Sec and Class 5 wormholes are not equally distributed.

KNOWN SPACE BY CHI-SQUARE RANKING

WHAT DOES IT MEAN?

- Using a connection that leads to High Sec, the expected probability of landing in Genesis was 3%. Based on observed data, Genesis was 20%. (9 out of 45).

- Using a connection that leads to High Sec, the expected probability of landing in Molden Heath was 1%. Based on observed data, Molden Heath was 9%. (4 out of 45).

- Together, both Genesis and Molden Heath accounted for 29% of jumps to High Sec.

- Using a connection that leads to Class 5 wormhole space, the expected probability of landing in E-R00024 was 4%. Based on observed data, E-R00024 was 19%. (4 out of 21).

RAW DATA FOR THE ANOMALIES

Date	From	Region	Constellation	System	Class	SIG	ID	Space	Class	To	Region	Constellation	System	Class
4/16/2016	K-Space	Querious	MPJW-6	49-U6U	NS	XDX	N432	W-Space	Class 5	W-Space	E-R00024	E-C00329	J001025	Class 5
4/18/2016	W-Space	Region 25	Constellation 249	J123602	Class 5	-	H296	W-Space	Class 5	W-Space	E-R00024	E-C00329	J003546	Class 5
4/24/2016	K-Space	Domain	Maseend	Barira	HS	WZC	M555	W-Space	Class 5	W-Space	E-R00024	E-C00329	J012773	Class 5
4/24/2016	W-Space	Region 25	Constellation 249	J123602	Class 5	QSH	H296	W-Space	Class 5	W-Space	E-R00024	E-C00329	J012773	Class 5
4/14/2016	W-Space	Region 12	Constellation 120	J125216	Class 3	JYI	D845	K-Space	HS	K-Space	Genesis	Reya	Kobam	HS
4/14/2016	W-Space	Region 2	Constellation 9	J150629	Class 1	VRU	N110	K-Space	HS	K-Space	Genesis	Fabas	Bania	HS
4/14/2016	W-Space	Region 3	Constellation 18	J212338	Class 1	TTZ	N110	K-Space	HS	K-Space	Genesis	Mih	Zoohen	HS
4/14/2016	W-Space	Region 5	Constellation 32	J160014	Class 2	UHE	B274	K-Space	HS	K-Space	Genesis	Reya	Hirizan	HS
4/24/2016	W-Space	Region 2	Constellation 3	J153530	Class 1	TOY	N110	K-Space	HS	K-Space	Genesis	Sanctum	Tar	HS
5/7/2016	W-Space	Region 8	Constellation 65	J151248	Class 2	AWJ	B274	K-Space	HS	K-Space	Genesis	Sanctum	Tekaima	HS
5/26/2016	W-Space	Region 8	Constellation 65	J151248	Class 2	NDV	B274	K-Space	HS	K-Space	Genesis	Ekrin	Ashokon	HS
6/3/2016	W-Space	Region 2	Constellation 6	J101817	Class 1	OXQ	N110	K-Space	HS	K-Space	Genesis	Fabas	Bania	HS
6/4/2016	W-Space	Region 12	Constellation 110	J151405	Class 3	BNM	D845	K-Space	HS	K-Space	Genesis	Sanctum	Kemerk	HS
4/15/2016	W-Space	Region 3	Constellation 16	J101845	Class 1	DPT	N110	K-Space	HS	K-Space	Molden Heath	Besateoden	Varigne	HS
4/19/2016	W-Space	Region 8	Constellation 62	J212906	Class 2	NOI	B274	K-Space	HS	K-Space	Molden Heath	Fittakan	Gulfonodi	HS
4/22/2016	W-Space	Region 3	Constellation 20	J121915	Class 1	YUK	N110	K-Space	HS	K-Space	Molden Heath	Besateoden	Varigne	HS
5/7/2016	W-Space	Region 8	Constellation 62	J212906	Class 2	KPK	B274	K-Space	HS	K-Space	Molden Heath	Eoldulf	Fegomenko	HS

CONCLUSIONS

- To positively confirm these results, we need to meet the minimum conditions for the Chi-Square Goodness of Fit test of at least 5 observations per region in High Sec and Class 5 wormholes. More data is needed.

- The p-value results for both High Sec and Class 5 are way out of sync with the reminder of the findings, it seems unlikely the rejected result of the null hypothesis would be reversed with more data, but it is possible.

- Even allowing for the minimum conditions of the Chi-Square test not being met, there seems to be enough data to say something odd is going on Genesis, Molden Heath, and E-R00024.

- If we assume that more data will positively confirm these results, then the majority of known wormhole type connections are equally random across their respective destinations, with the exception of our 3 mysterious regions.

- We know there's something special about the Genesis region, the location of the EvE Gate. E-R00024 is home to the shattered system J013146 with the Talocan Static Gates and sleepers. What about Molden Heath?

LINKS

- W-Space – Why you not random?

- Wormhole Type Database

- Database of New Eden Systems

- Project "W" Phase I Data

- Signal Cartel