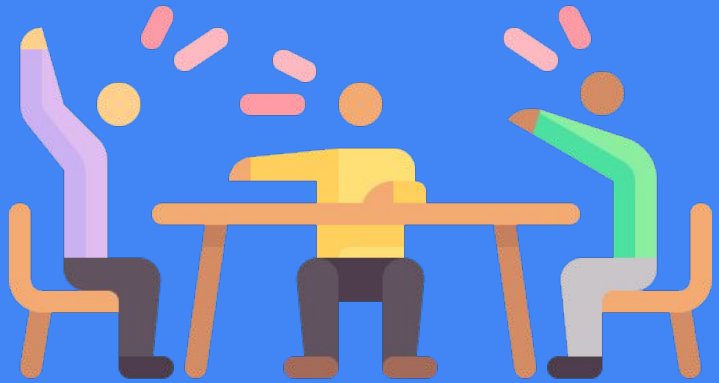
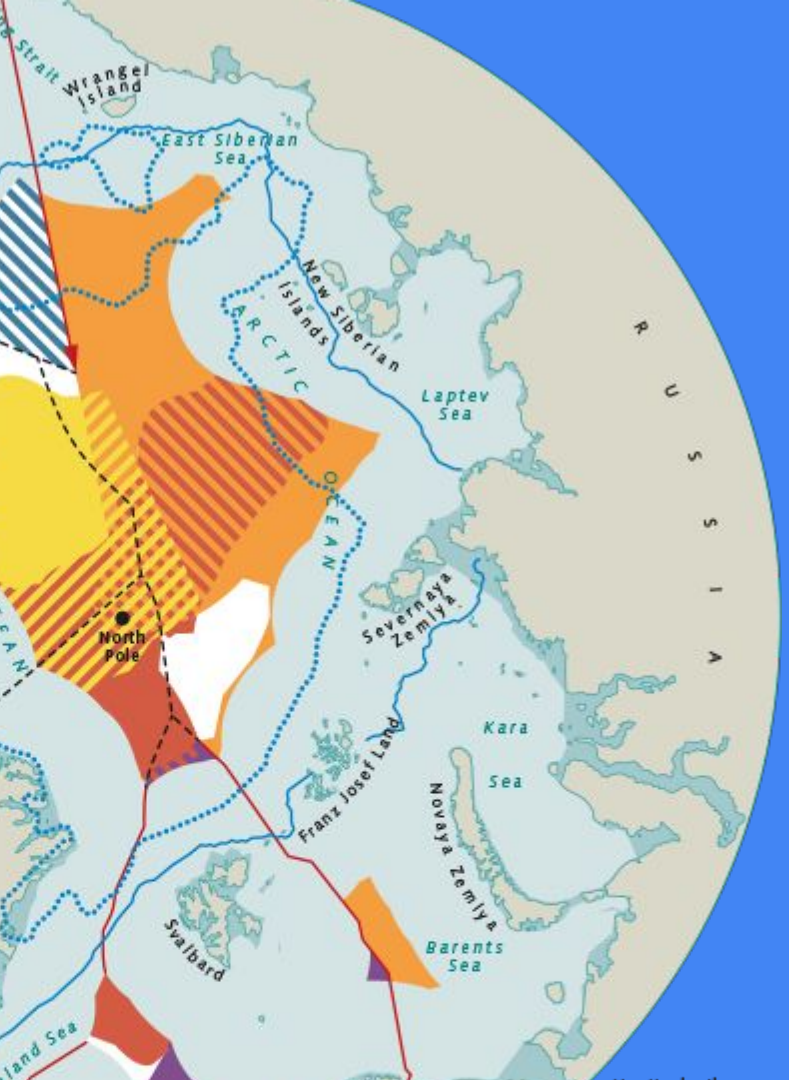
Mapping Boundaries: Exploring design decisions for a neutral mapping of border disputes

By Liam Fleming
Original concept and supervision by Menno-Jan Kraak

Motivation & Problem Statement





Research Objective

R.O. 1: To analyse the current state of border disputes visualization & explore how they might be made more neutral

R.Q. 1 - What is the current state of border dispute visualization?

- Fundamentals theoretically & visually

R.Q. 1.1 - What are border disputes?

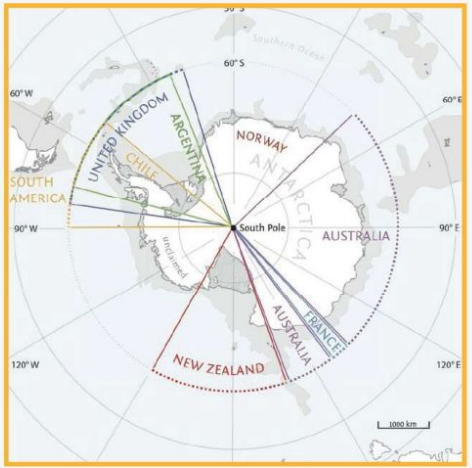
What is a border dispute?

Categorization by Brunett Jailly

Territorial

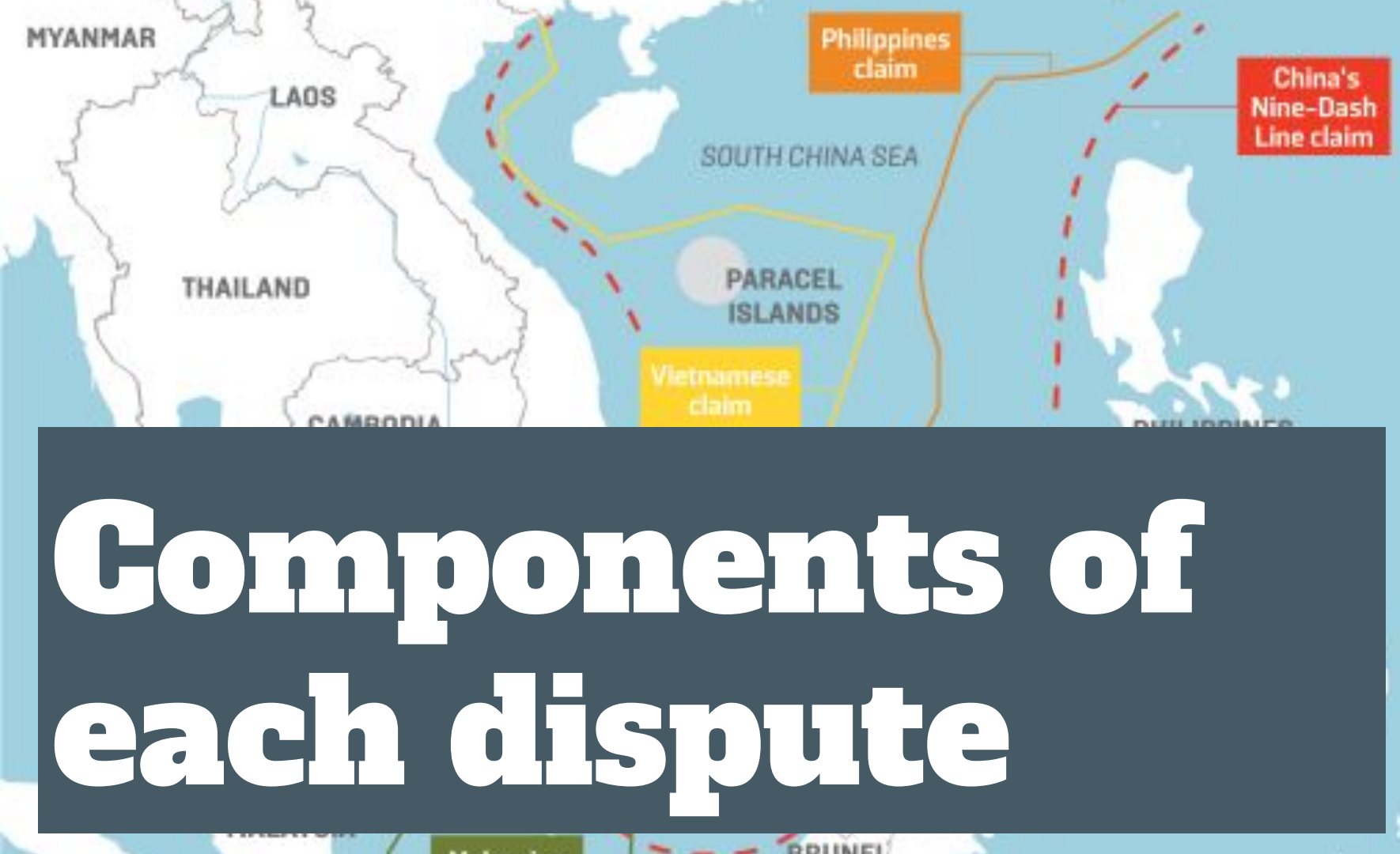
Positional

Functional



Causes

- Human qualities (presence, language, culture, history, religion)
- Self-determination and Plebiscite
- (Right or wrong) Occupation of the land
- Contiguity and Propinquity with the disputed land
- Hinterland/coastal rights
- Symbolic possessions
- Uti Possidetis Juris (return to indigenous rule/post colonialism)
- Conquest
- Territorial coherence/features/topography, or natural boundary
- Law of high lands
- Economic Unity & Trade
- Reparation/compensation



Components of each dispute

Contents [hide]

1 India–Pakistan conflict
- 1.1 Background
- 1.2 Partition and invasion
- 1.3 Accession
- 1.4 Indo-Pakistani War of 1947
- 1.5 UN mediation
- 1.6 Dixon Plan
- 1.7 1950 military standoff
- 1.8 Nehru's plebiscite offer
- 1.9 Cold War
- 1.10 Sino-Indian War
- 1.11 Operation Gibraltar and 1965 Indo-Pakistani war
- 1.12 1971 Indo-Pakistani war and Simla Agreement

2 Internal conflict
- 2.1 Political movements during the Dogra rule (1846–1947)
- 2.2 Autonomy and plebiscite (1947–1953)
- 2.3 Period of integration and rise of Kashmiri separatism (1954–1974)
- 2.4 Revival of National Conference (1975–1983)
- 2.5 Rise of the separatist movement and Islamism (1984–1986)
- 2.6 1987 state elections
- 2.7 1989 popular insurgency and militancy
- 2.8 1989–1990 exodus of Kashmir Pandits
- 2.9 1999 conflict in Kargil
- 2.10 2000s Al-Qaeda involvement
- 2.11 2008–present

3 National stances
- 3.1 Indian view
- 3.2 Pakistani view
- 3.3 Chinese view
- 3.4 Kashmiri views
- 3.5 Water dispute

4 Efforts to end the dispute
- 4.1 Settlement formulas
  - 4.1.1 Rajaji-Abdullah formula
  - 4.1.2 Chenab formula
- 4.2 Contemporary views on UN resolutions

5 Pakistan's relation with militants

6 Human rights abuses
- 6.1 Indian administered Kashmir
- 6.2 Pakistan administered Kashmir
  - 6.2.1 Azad Kashmir
  - 6.2.2 Gilgit-Baltistan

7 Map legality

8 Statistics

9 Natural disaster diplomacy

10 See also

11 Notes

12 Citations

13 Bibliography

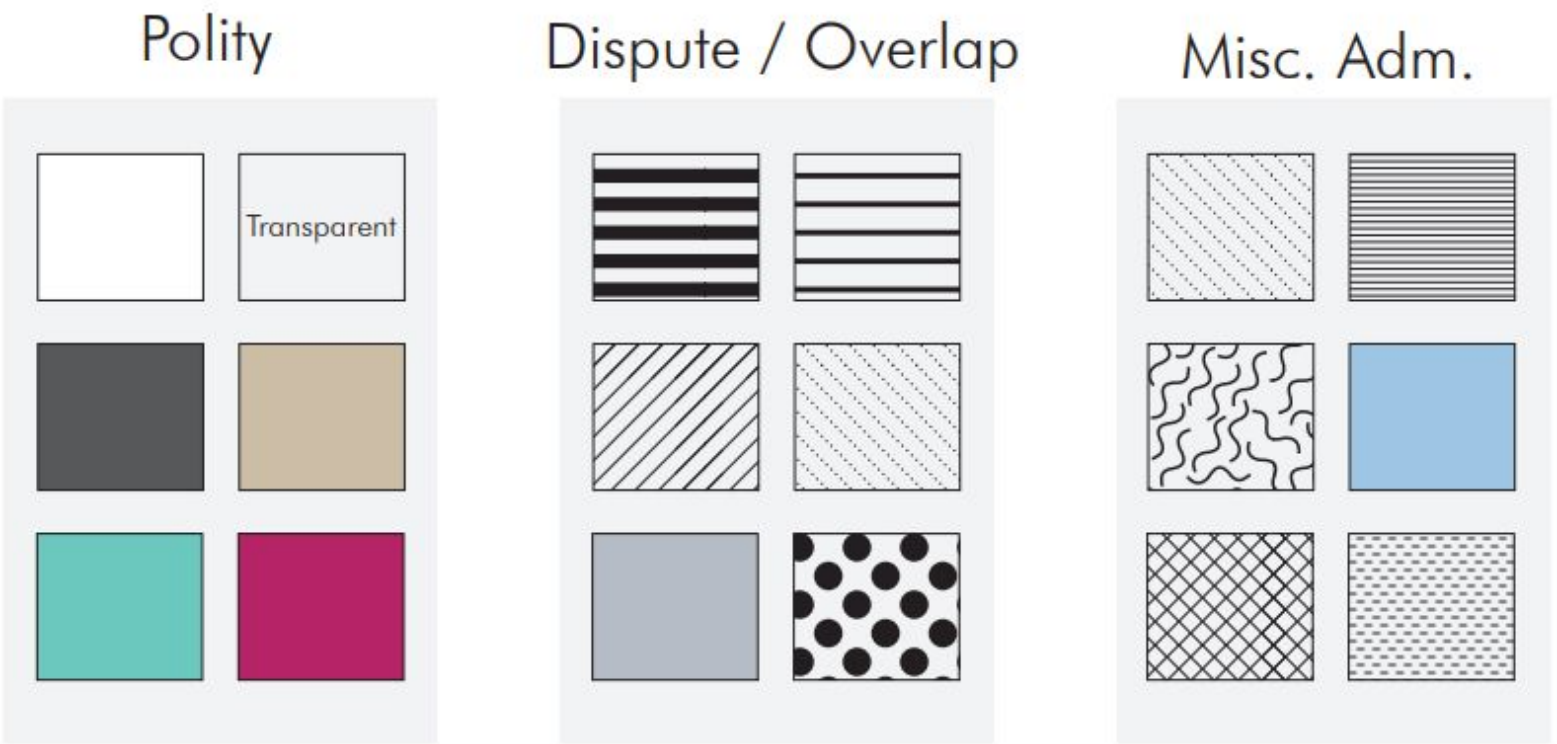
Lots, and lots of reading...

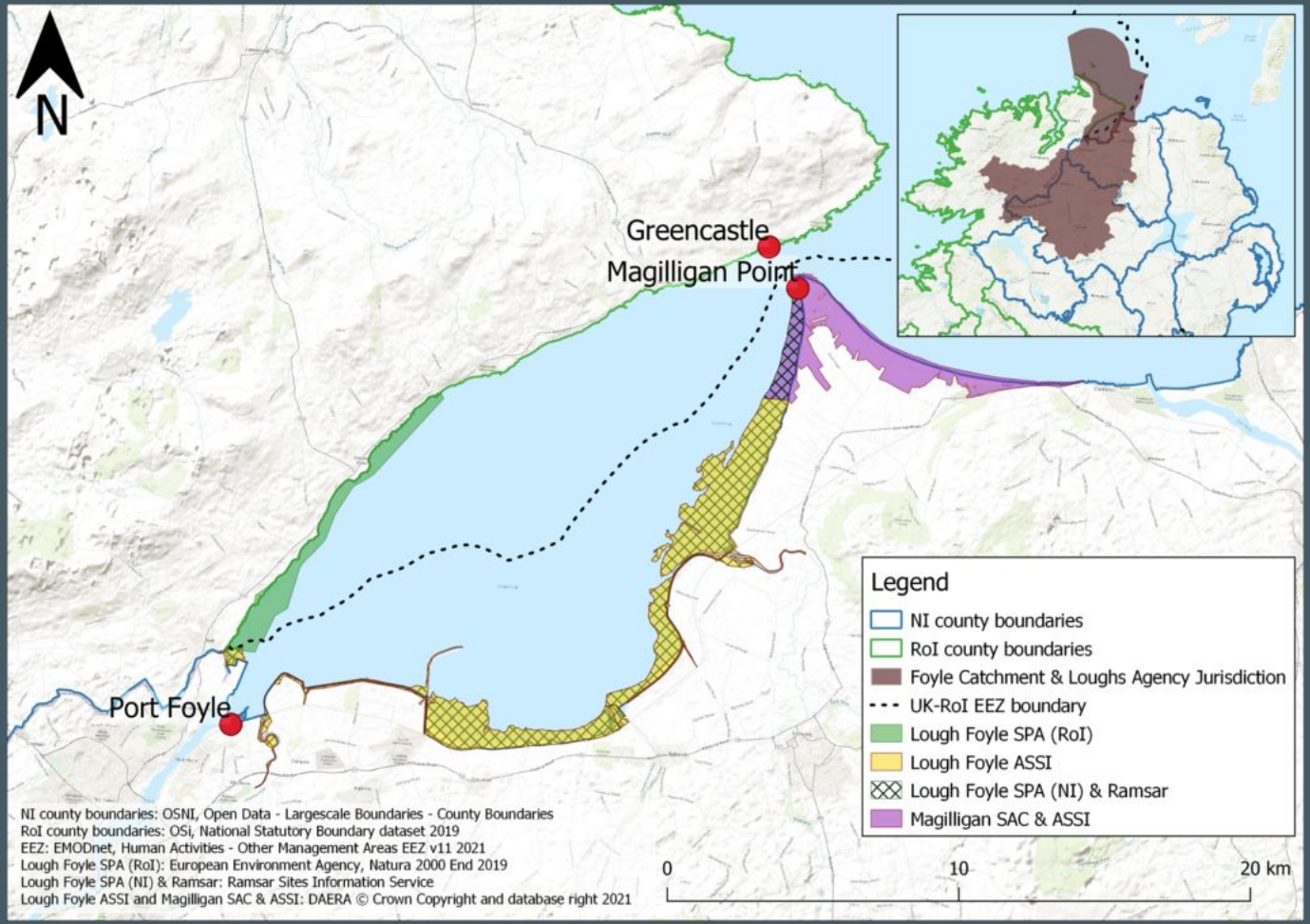
R.Q. 1.2 - What are the current practices in border dispute map design?

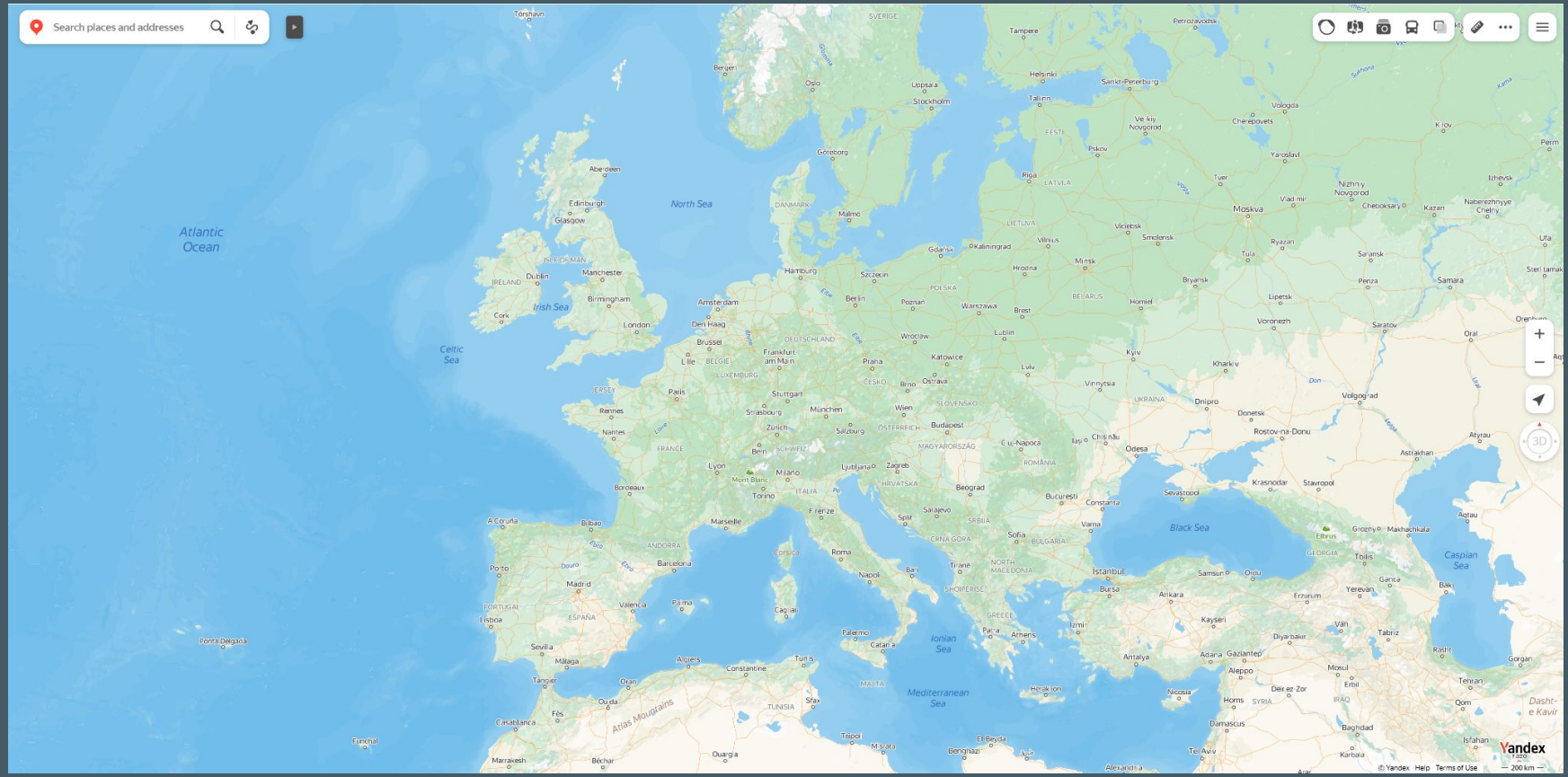
Line

Intl. Border
Provincial Border
Disputed Intl. B.
Misc. Dispute

Fill




N
Greencastle
Magilligan Point
Port Foyle
Legend
NI county boundaries
RoI county boundaries
Foyle Catchment & Loughs Agency Jurisdiction
UK-RoI EEZ boundary
Lough Foyle SPA (RoI)
Lough Foyle ASSI
Lough Foyle SPA (NI) & Ramsar
Magilligan SAC & ASSI
0
10
20 km
NI county boundaries: OSNI, Open Data - Largescale Boundaries - County Boundaries
RoI county boundaries: OSi, National Statutory Boundary dataset 2019
EEZ: EMODnet, Human Activities - Other Management Areas EEZ v11 2021
Lough Foyle SPA (RoI): European Environment Agency, Natura 2000 End 2019
Lough Foyle SPA (NI) & Ramsar: Ramsar Sites Information Service
Lough Foyle ASSI and Magilligan SAC & ASSI: DAERA © Crown Copyright and database right 2021


Search places and addresses
Atlantic Ocean
North Sea
Irish Sea
Celtic Sea
Black Sea
Caspian Sea
Mediterranean Sea
Ionian Sea
Atlas Mountains
Yandex

R.Q. 1.3 - What is neutral map design?

Map creation through the application of cartographic design principles through the lens of neutral philosophy.

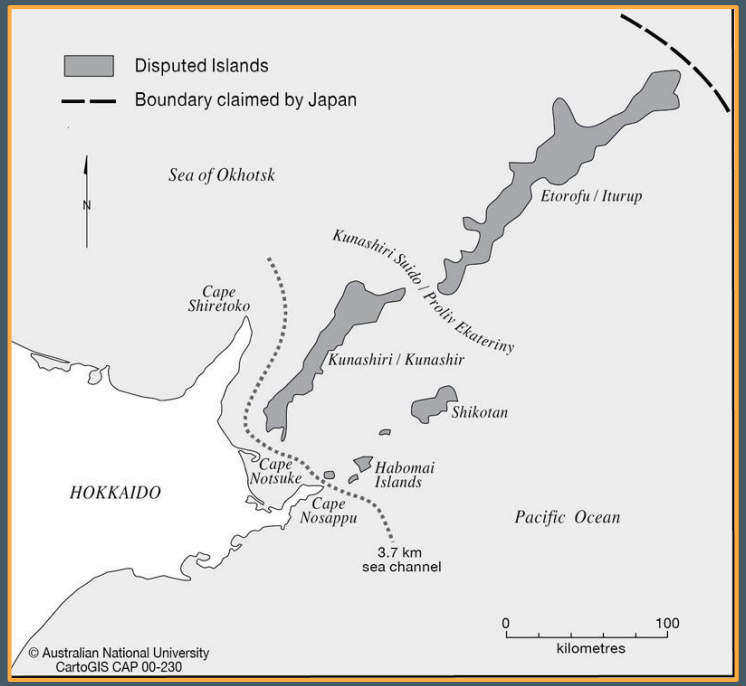
What is neutral?

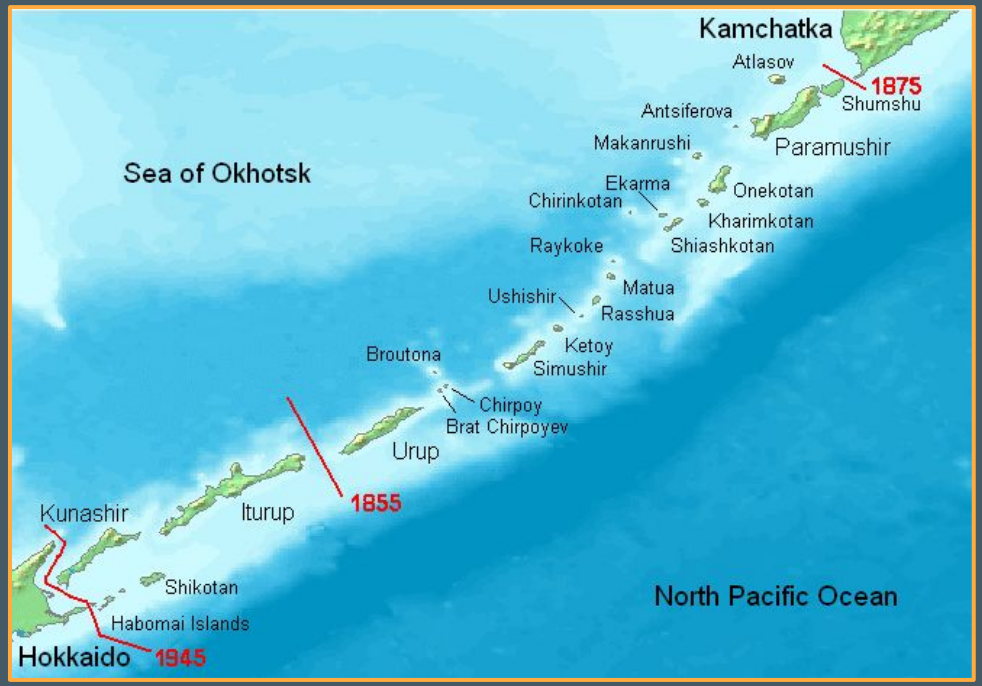
Neutrality as a philosophy

Why pursue
neutral map design?

What exactly is neutral map design?

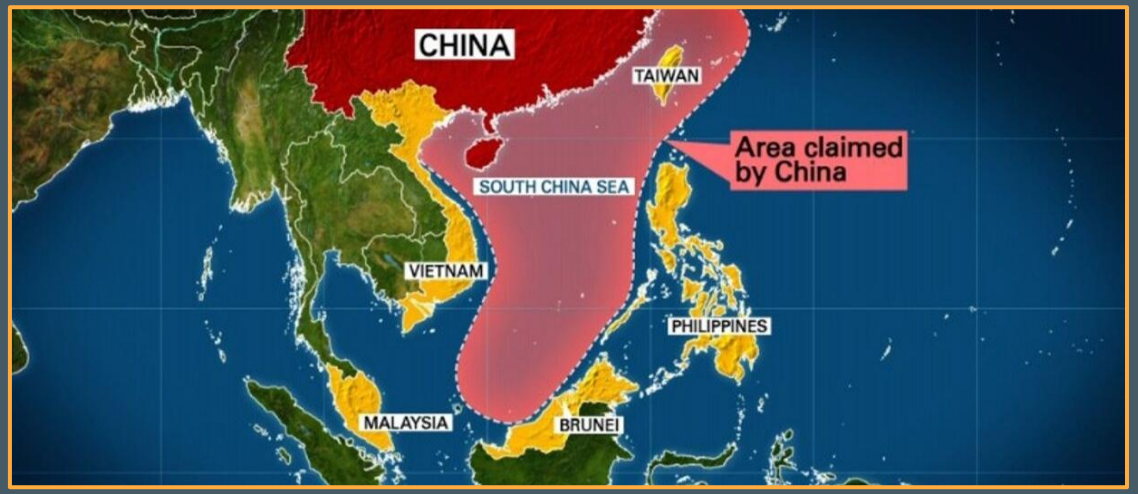
What


Disputed Islands
Boundary claimed by Japan
N
Sea of Okhotsk
Etorofu / Iturup
Kunashiri Suido / Proliv Ekateriny
Cape Shiretoko
Kunashiri / Kunashir
Shikotan
Cape Notsuke
Habomai Islands
HOKKAIDO
Cape Nosappu
Pacific Ocean
3.7 km sea channel
0
100
kilometres
© Australian National University
CartoGIS CAP 00-230


Kamchatka
Atlasov
1875
Shumshu
Antsiferova
Paramushir
Makanrushi
Sea of Okhotsk
Ekarma
Onekotan
Chirinkotan
Kharimkotan
Raykoke
Shiashkotan
Matua
Ushishir
Rasshua
Ketoy
Broutona
Simushir
Chirpoy
Brat Chirpoyev
Urup
1855
Kunashir
Iturup
Shikotan
Habomai Islands
North Pacific Ocean
Hokkaido
1945

How

Afghanistan
China
KARAKORAM MOUNTAINS
Northern Areas
(administered by Pakistan)
(claimed by India)
Saichen Glacier
Aksai Chin
(administered by China)
(claimed by India)
Line of Control
Jammu & Kashmir
(administered by India)
(disputed by Pakistan)
Islamabad
Pakistan
India

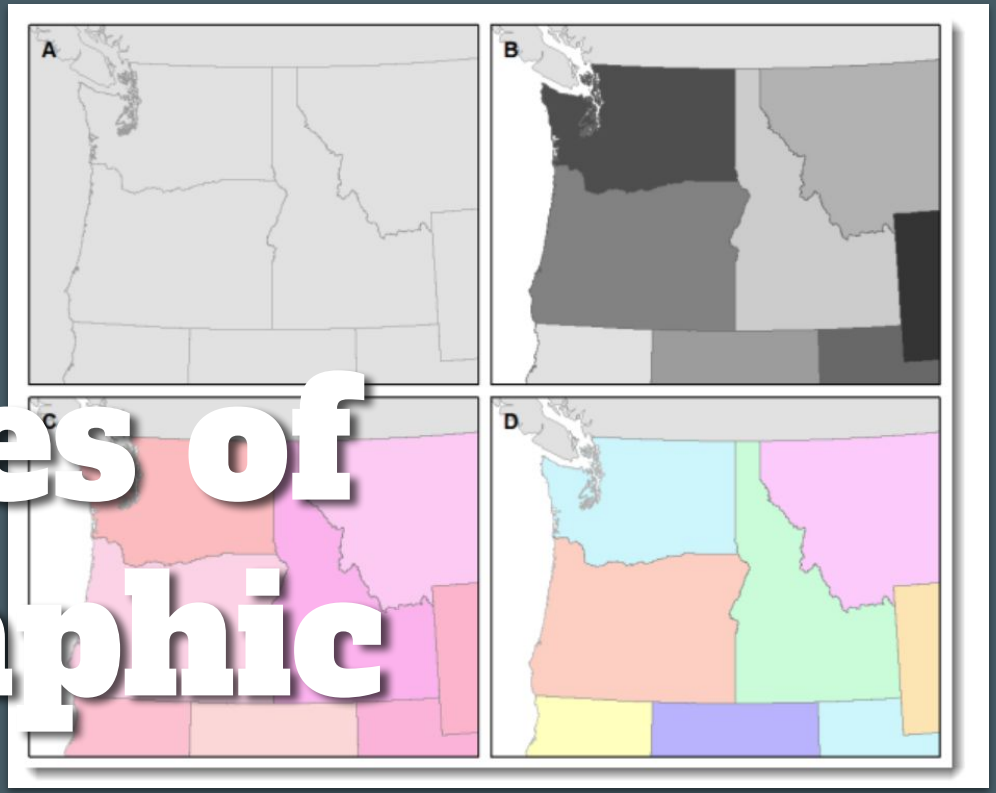

CHINA
TAIWAN
Area claimed by China
SOUTH CHINA SEA
VIETNAM
PHILIPPINES
MALAYSIA
BRUNEI

R.Q. 1.4 - What can be learned from other studies & maps.

- Revisiting cartographic design fundamentals & principles.
- Various insights into new techniques that can be applied to neutral map design.

Principles

Principles of cartographic design



Other studies?

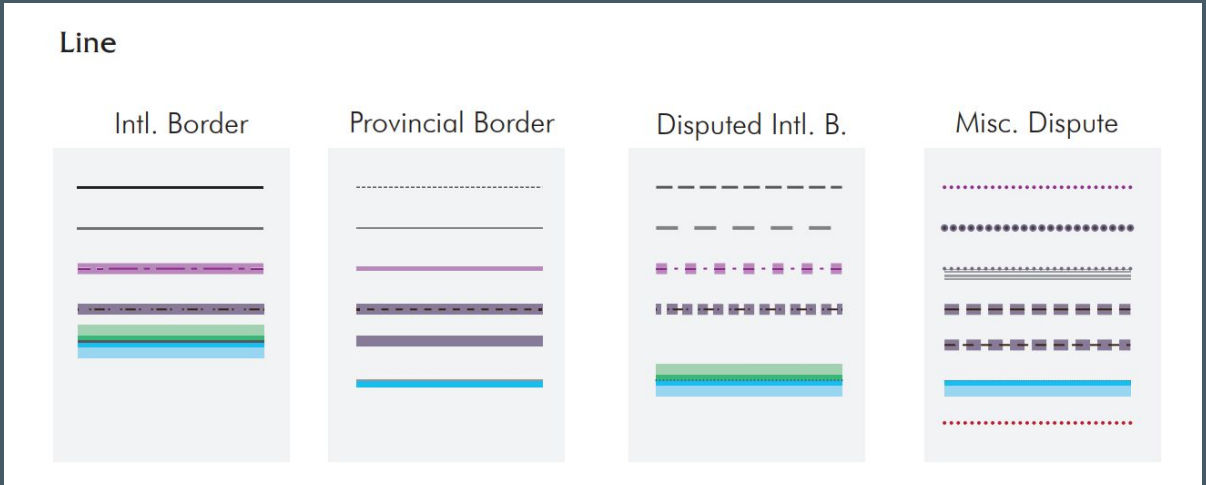
Literature Review

R.O. 2: To establish a suitable categorization & preliminary design guideline, and creation of an exemplary map using this guideline.

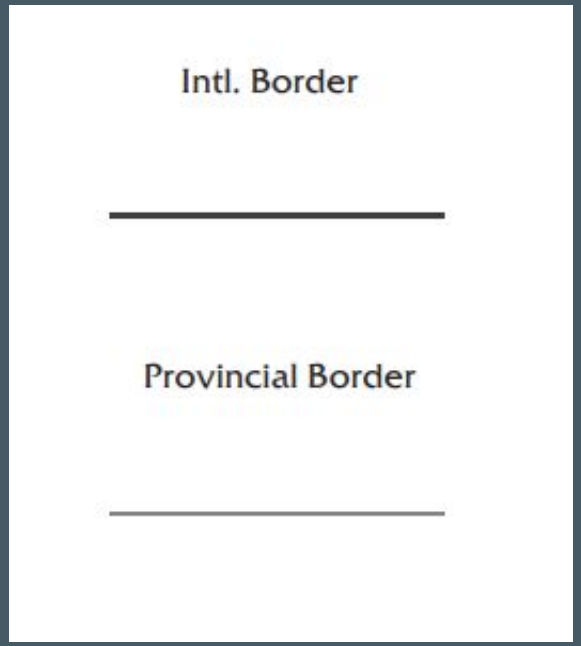
R.Q. 2 - With the results of R.O. 1, what design considerations might be established for border dispute maps?

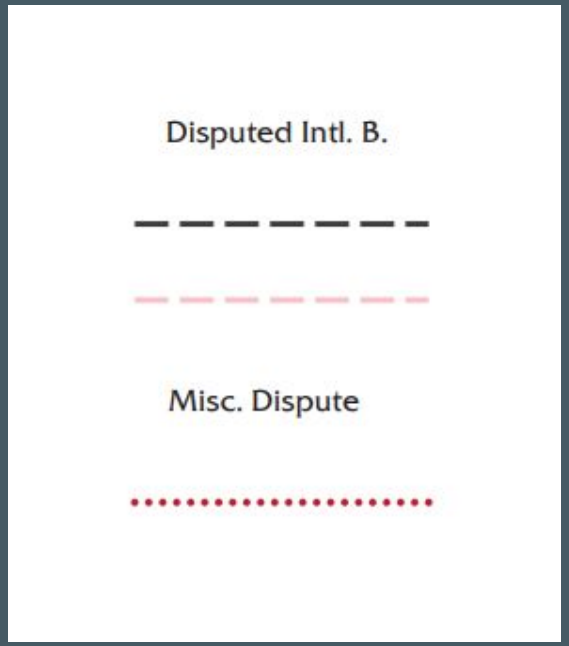
R.Q. 2.1 - What broad neutral design guidelines can be established?

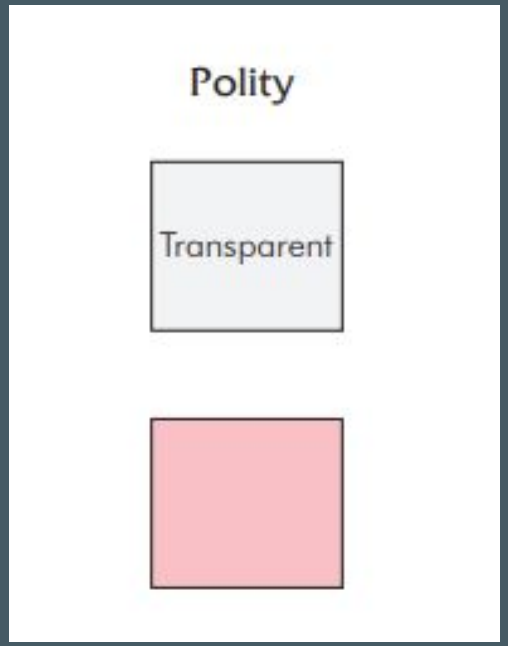
- Here we establish how the fundamental visual elements may be visualized across all types of border disputes



Broad Design Guidelines







No Design Rules

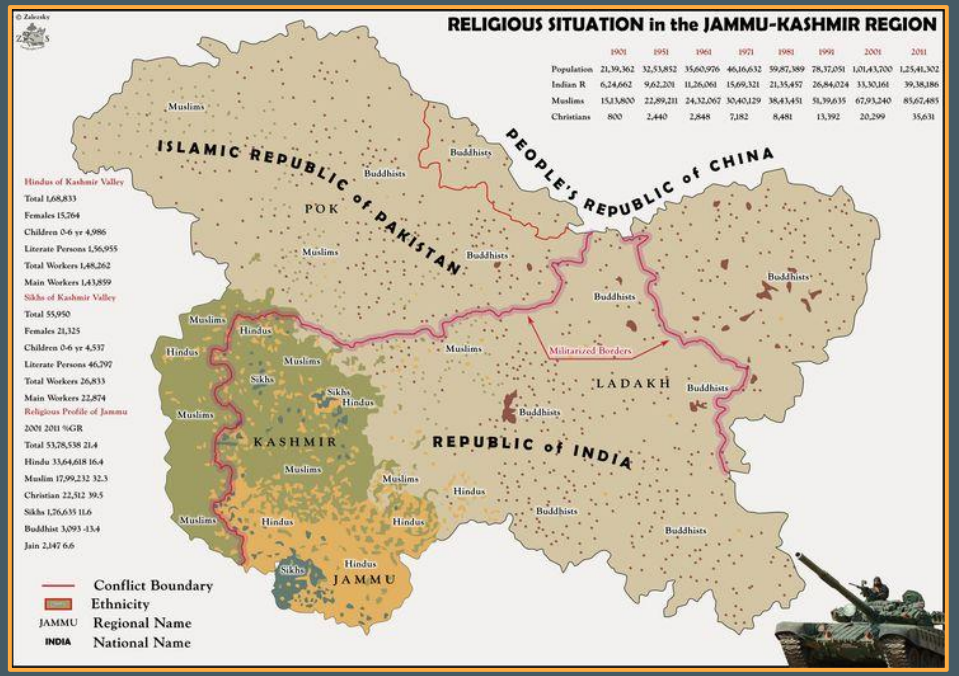
R.Q. 2.2 - How might one categorize the different types of border disputes from a design perspective?

- In order for further design decisions to be made for each category

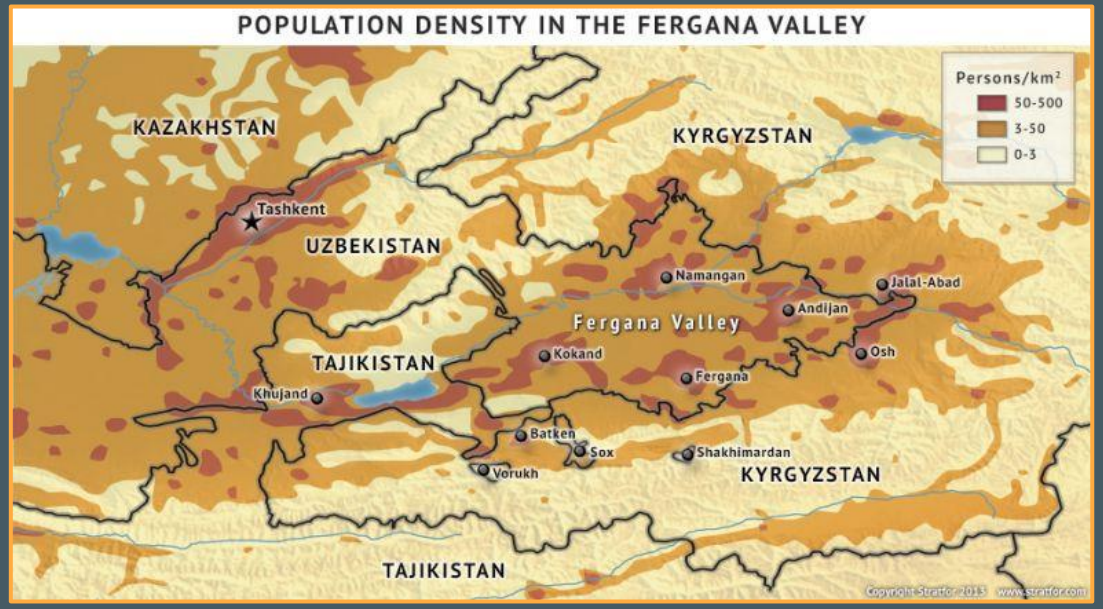
Trouble categorizing visually

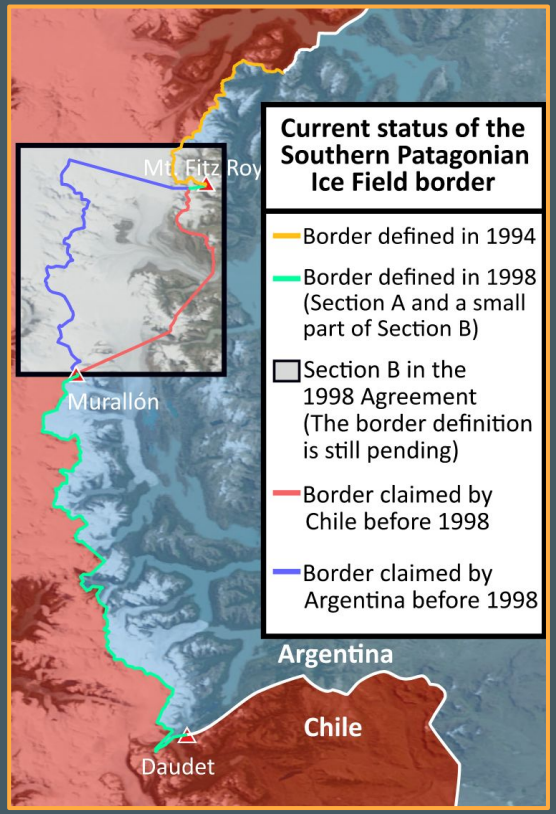
	Visual vs Type	Communities	Topography	Resources	Movement	Maritime
Basemap	Topographical					
	Satellite Imagery					
	Street Map					
	Minimal					
Num. data	Vote data					
	Religion					
	Language					
	Pop. Density					
Misc.	Highlight river or lake					
	Highlight mountains					
	Historical borders					
	Resources					
	City point					
	EEZ					

		Land		Land		Maritime	
	Elements:	Communities		Topographical & resources		Incl. topographical, movement, resources	
Projection		SAME					COMMONLY VISUALIZED
Typography&Lang		SAME					
Basemap	Topographical						SOMETIMES VISUALIZED
	Satellite Imagery						
	Street Map						RARELY VISUALIZED
	Simple						
Line symbols	Boundary lines						
Undisputed	Physical Walls						
	Historical boundary						
	EEZ						
	Sea-shelf						
	Land routes						
	Sea routes						
	Straits & channels						
	Various disputed						
Point Symbols	Cities						
	Resources/deposits						
	Islets						
	Other data						
Area symbols	Disputed area						
	Glacier						
	Water body highlighted						

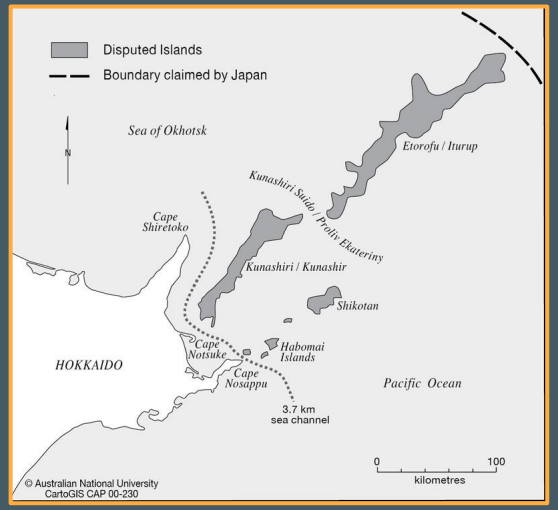


Communities

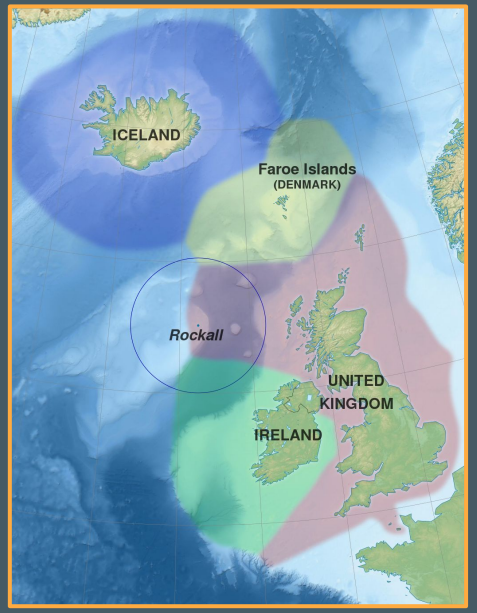




Topographic


Disputed Islands
Boundary claimed by Japan
Sea of Okhotsk
Etorofu / Iturup
Kunashiri Suido / Proliv Ekaterины
Cape Shiretoko
Kunashiri / Kunashir
Shikotan
Habomai Islands
Cape Notsuke
HOKKAIDO
Cape Nosappu
Pacific Ocean
3.7 km sea channel
0
100
kilometres
© Australian National University
CartoGIS CAP 00-230

CHINA
Taiwan
Hong Kong
Macau
Hanoi
Haiphong
Gulf of Tonkin
Hainan Dao
See "The Paracel Islands"
Paracel Islands
Crescent Group
Amphitrite Group
Triton Island
LAOS
THAILAND
VIETNAM
CAMBODIA
Phnom Penh
Ho Chi Minh City
South China Sea
See "The Spratly Islands"
Spratly Islands
PHILIPPINES
Manila
Luzon
Mindoro
Palawan
Mindanao
Sulu Sea
Sabah State
Bandar Seri Begawan
BRUNEI
INDONESIA
MALAYSIA
SINGAPORE
Borneo
China, Malaysia, Philippines, Taiwan, and Vietnam all have claims to the Spratly Islands. China, Taiwan, and Vietnam claim the Paracels. Claim lines shown on this map are only those relevant to these two island groups.


ICELAND
Faroe Islands
(DENMARK)
Rockall
UNITED KINGDOM
IRELAND

Maritime

R.Q. 2.3 - What further design considerations can be made for each category of border dispute map?

Example: Maritime Guidelines

R.Q. 2.4 - How does one apply these newly established design considerations to create a boundary dispute map

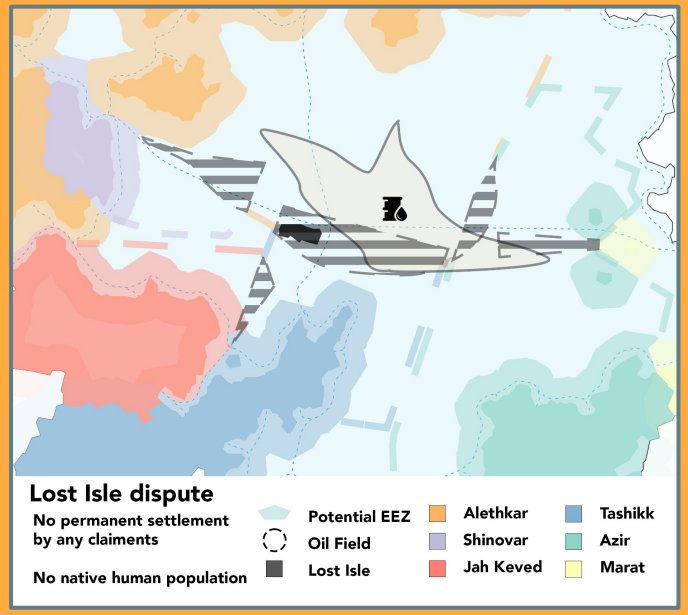
Format of the final guideline

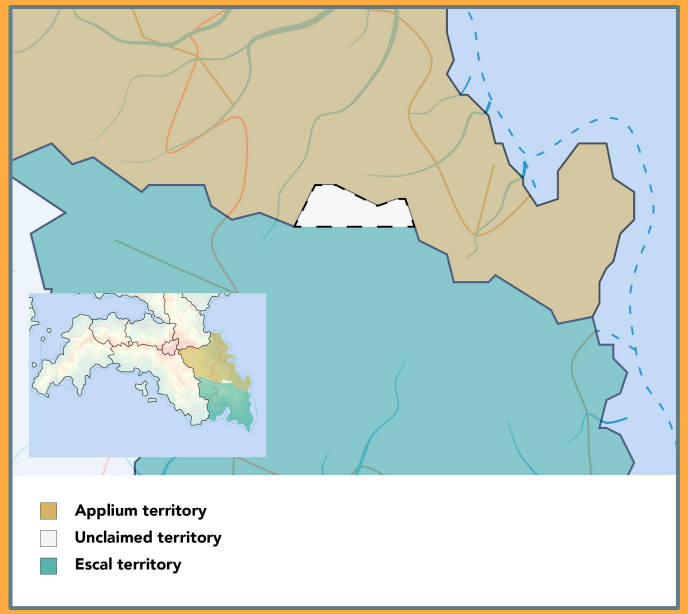
cartographic principles
Legibility
Balance
Figure-Ground
Hierarchical Organization

Figure-Ground
Hierarchical Organization
BROAD
Core Map Symbols
Line
Area
Point
Disputed Intl. B.
Misc. Dispute
Intl. Border
Provincial Border
Polity
Dispute
Misc. Adm.
Urban area
Misc.

Applying the preliminary guidelines

Exemplary Map Creation enabled





Skjolmir
N
NURI REPUBLIC
Takilasan
Scrani
94% of the populace within the former kingdom are followers of Tako, the state religion of Nuri. Nuri claim most of the former kingdoms territory on the grounds that its majority want to be part of Nuri instead. Many do, but not all.
Moneir
Hlymrykr
Torcplain
Lindar
Tulryk
The militized ceasefire line was established in February 1982 after ratification of the Ingot peace treaty.
DRUDOR
Drudor controls the smallest, mainly uncolonised segment, which Nuri recently renounced their claim to. Tegulia continues to claim this sparse area.
The rocky glacier acts as a natural unpassable barrier for all sides of the conflict.
Ravenfjal
Glacier
Elkvale
Innsjøby
TEGULIA
The last King of Vaegir ceded his land to Tegulia, and so they claim the entire former kingdom on its Height basis.
Eggetid
ELEGTIR
Vaegir border dispute
Perspective on the ground
Ceasefire line
International Border
Provincial Border
Tegulian Claims
Nurish Claims
Historical Kingdom of Vaegir
Tegulian control
Drudor control
Nurish control
National capital
Provincial Capital
City >100K
References
[1] It was revealed to me in a dream

Skjolmir
N
Takilasan
Scrani
NURI REPUBLIC
Moneir
Hlymrykr
Torcplain
Lindar
Tulryk
The militized ceasefire line was established in February 1982 after ratification of the Ingot peace treaty.
DRUDOR
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Elkvale
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The last King of Vaegir ceded his land to Tegulia, and so they claim the entire former kingdom on its Height basis.
Eggetid
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Vaegir border dispute
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International Border
Provincial Border
Tegulian Claims
Nurish Claims
Historical Kingdom of Vaegir
Tegulian control
Drudor control
Nurish control
National capital
Provincial Capital
City >100K
References
[1] It was revealed to me in a dream

R.O. 3: To evaluate whether an exemplary map's design is perceived to be more neutral by users when compared to a map created without the guideline

R.Q. 3 - How can we evaluate the exemplary map to judge if it's successful?

R.Q. 3.1 - Are exemplary maps perceived as more neutral when compared to comparison maps?

R.Q. 3.2 - Do exemplary maps, in their specific categories, give the reader a more correct impression of the border conflicts when compared to comparison maps

How to evaluate neutrality?

DISPUTE CATEGORY & INSPIRATION	**Key notes for presentation** (*aside from how the cartographic principles are treated*)
Maritime	
Neutral: South China Sea	Topography (islets) and resources (textually). Text emphasize UNCLOS (real legal).
Non-neutral: South China Sea	Topography (islets) and resources (textually). Military base to allude to permanent inhabitation (justify by communities). Biased wording.
Communities	
Neutral: Kashmir	Overview map (general) Legal & historical focus (claim 1) Community (claim 2), Election (on the ground, neither claim).
Non-neutral: Former Yugoslavia	Overview historical map, and legal & historical focus (claim 1). No other map. Biased wording.
Topography	
Neutral: Ice Field Dispute	Overview map featuring Topography (Ice Field) and Resources (Water – Glaciers - National Park protection). Historical map to help explain current situation which supports neither side.
Non neutral: Okpara River Dispute	Single overview map focusing on Topography (Isles) Resources (Nomad pastoral land). Biased wording for claim 1, but state claim 2 is legally correct. History explained but not shown.

ERETHOR
Scrani
UTHARI PROVINCE
Ostvale
Zlusa
Khesa
Fima
Cefiel
Laketon
APLOSI PROVINCE
Wadlas
Xagos
Taesa
COUNTY GRIALE
Haarpus
Sadena
International border
Provincial line
Before Disso
ERETHOR
Scrani
UTHAR
Ostvale
Zlusa
Khesa
Fima
Cefiel
IDRIAL
Laketon
UTHAR OCCUPIED GRIALE
APLOS
Wadlas
Xagos
Taesa
GRIALE, COUNTY OF APLOS
Haarpus
Sadena
Griale dispute
Ceasefire line
International Border
National capital
City >100K

PRE-WAR BORDERS
(1972)

MAJOR RELIGION BY PROVINCE
(circa 1975)

ELECTION RESULTS BY PROVINCE
(2018)

Section 1 of 8

Border Dispute Map - Neutrality

In this short poll you will be presented with an array of maps about 6 border disputes and asked a couple simple multiple choice questions on each about your perception of them.

The border disputes themselves are fictional, simplified and inspired by real disputes, to help prevent bias. Please read the brief textual overview related to each one.

Respondents

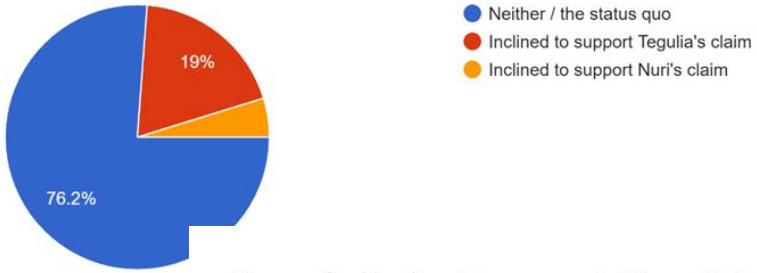
Do you feel inclined to support either side? *

- ◯ Neither / the status quo
- ◯ Uthar
- ◯ Aplos
- ◯ Other...

Summary of Results

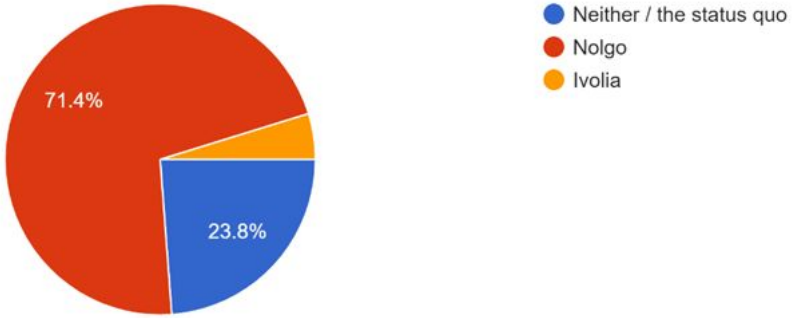
Do you feel inclined to support either side?

21 responses



Do you feel inclined to support either side?

21 responses



A slightly higher percentage of people stated they were inclined to support nations in the non-neutral maps simply due to how they felt or looked.

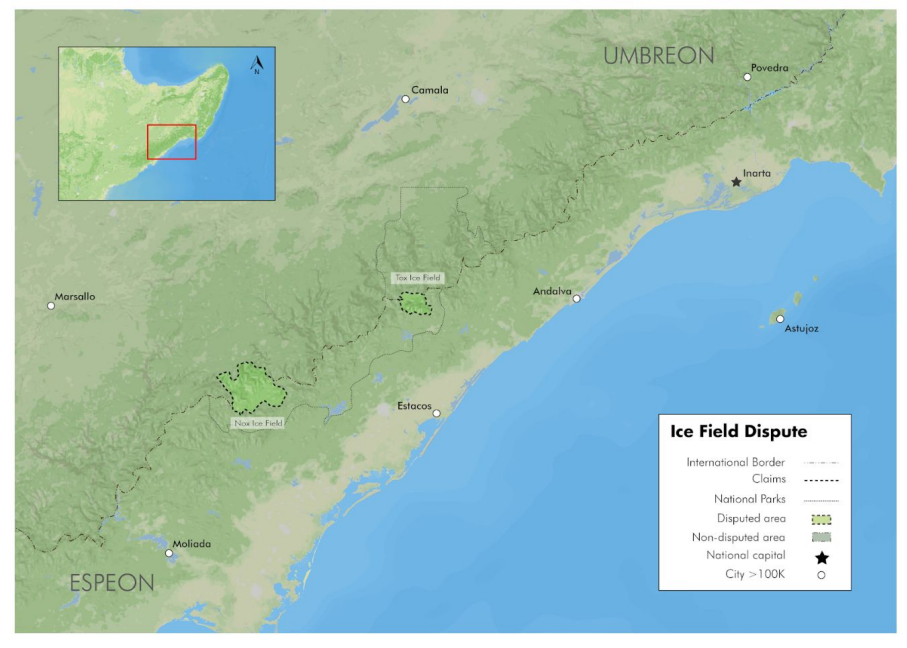
75.5% (a total of 35 checkboxes) for the non-neutral maps
68.7% (a total of 11 checkboxes) for the neutral maps.

A much higher percentage of people stated they were inclined to support nations in the neutral maps due to the available visual map information.

42.5% (a total of 17 checkboxes) for the non-neutral maps
81.2% (a total of 13 checkboxes) for the neutral maps.

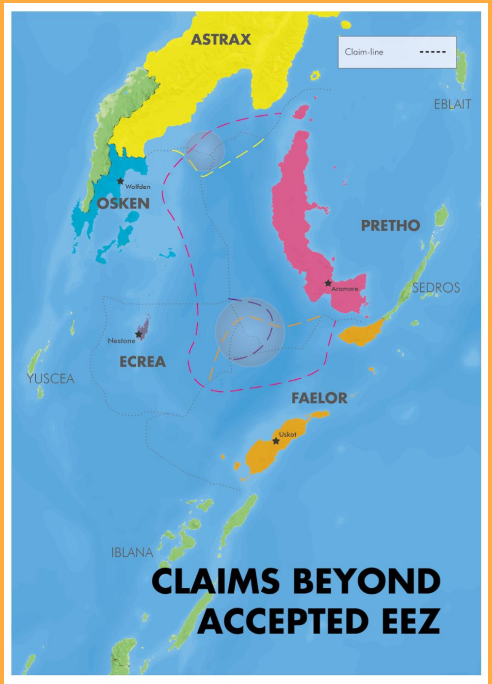
An equal percentage of people stated that textual information was a contributing factor to inclination towards supporting a nation.

50% (a total of 20 checkboxes) for the non-neutral maps
50% (a total of 8 checkboxes) for the neutral maps.



Topographic insights

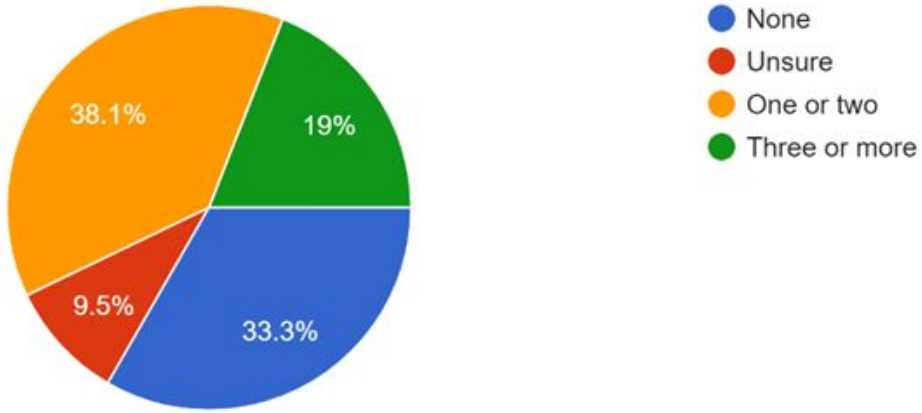
Communities Insights



Maritime insights

The basemaps were all mostly real locations with fabricated borders overlayed. Did you recognize where any of the basemaps were in real life?

21 responses



Future Work: Border Dispute Visualization

- Specific evaluation of different aspects, e.g., pre-existing map symbols, features, formats, and design principles.
- Evaluation exclusively of map categorization.
- Exploration of new design methods.

Conclusion

- **Maps designed following the guideline were broadly perceived as more neutral than maps designed against it.**
- **When respondents felt inclined to support a side in a neutral designed map it was more often based on available information rather than how the map felt.**

WHY MAP IMPARTIALLY

The importance of neutral map design when it comes border dispute region relies heavily relies on its purpose and the user. A web navigation map for example, may design borders in a manner that might be perceived as biased or apathetic but still accomplish its core function regardless of how borders are shown. However, in the likes of an educational atlas or journalistic article if a map depicting such regions omit important details it has failed in its goal to inform a reader in a way that accurately reflects the reality.

"All maps lie, but some maps lie more than others, and minimizing the spectrum from gratuitous to accidental lies has to be paramount"

KENNETH FIELD
Academic Cartographer & Geography

NEUTRAL MAP DESIGN

This miserable fate
Suffer the wretched souls of those, who liv'd
Without or praise or blame, with that ill band
Of angels mix'd, who nor rebellious prov'd
Nor yet were true to God, but for themselves
Were only.

NEUTRALITY

Refers to the philosophy of not saying or doing anything that would encourage or help any of the groups involved in an argument of war.

Arguments against neutrality state that being neutral can, directly or indirectly, end up favouring those who harm others or maintain a state of injustice.In Dante's Inferno the entrance of hell is even described as being full of those who remained neutral.

This critique may indeed be true in some cases, but when it comes to cartography, I interpret neutrality as simply visualizing everything as it is, in a way that reflects reality to the fullest, while also being hyperconscious of how every element of the map might have the potential to sway the map-reader in one direction or the other.

NEUTRAL MAP DESIGN

The creation of maps by application of pre-existing cartographic design principles through the lens of a neutral philosophy and using map elements in a way that are deliberately chosen to avoid expressing any strong opinion or feelings

Part of this is taking a neutral stance on what information one chooses to communicate through the map, showing the most essential information at the core of the dispute by default, and if possible, include further options to view relevant additional maps or map-layers which show the justifications or causes of a dispute, and potentially how areas of the disputed area is mapped by each side of the dispute. One can take a neutral stance in how elements are represented on the map by meticulously ensuring objectively

Thank you!