**Using GIS and Spatial Statistics to Predict Artifact Distribution at Fort Vancouver National Historic Site**

Marielle Pedro

Portland State University

Purpose

- Fort Vancouver National Historic Site Reconstruction of Hudson Bay Company buildings
  - Directed sampling strategy using GIS

- Creating a spatial distribution model, applicable to unexcavated buildings

- Testing spatial distribution model through random sampling in new excavations

HBC Sale Shop in 1860

Fort Vancouver Stockade

FORT VANCOUVER-Stockade Interior c.1844-1846
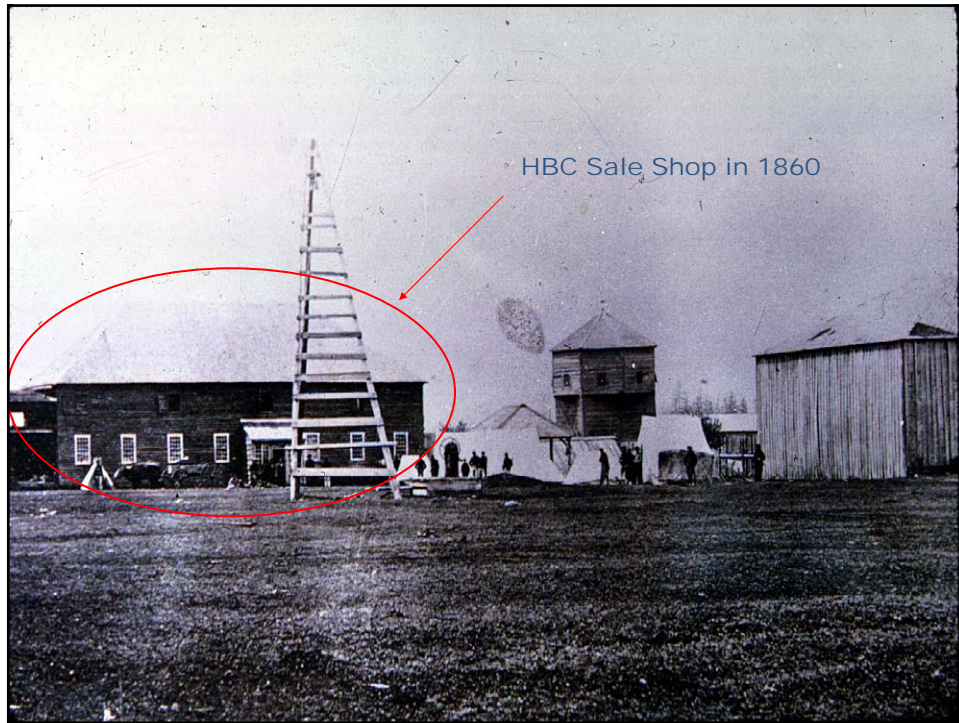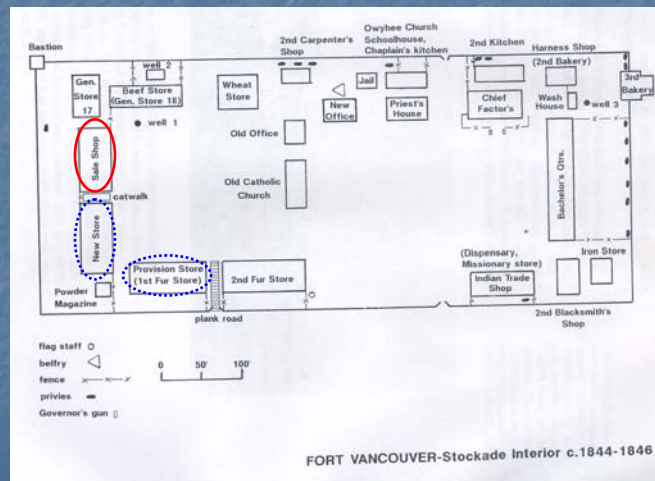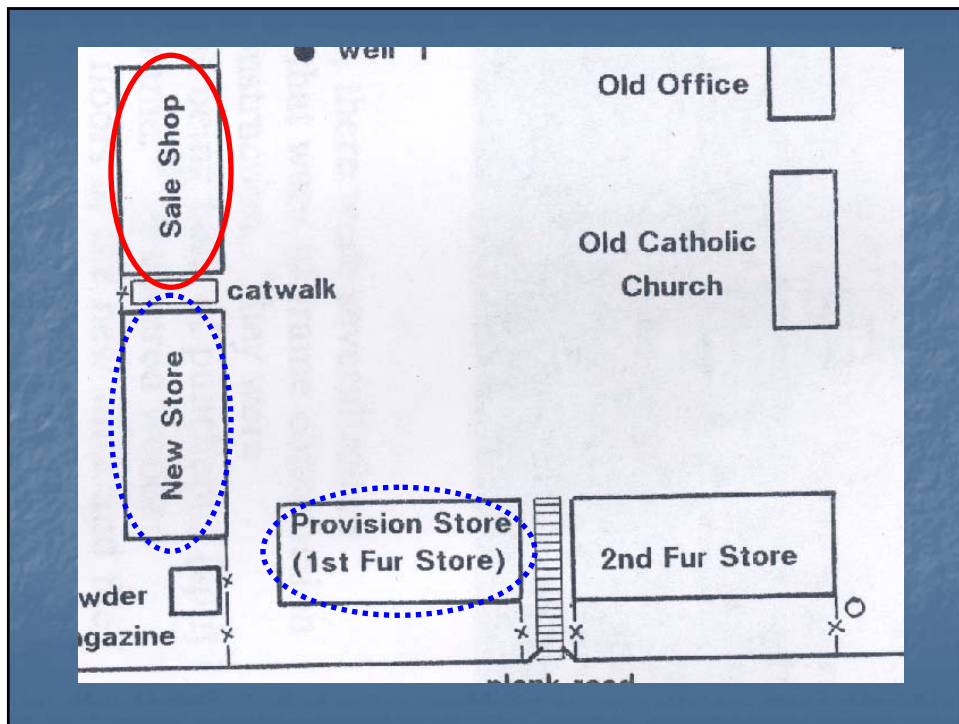
Sales Shop

- Built in 1840's, previous buildings existed on site

- Building size approximately   40 x 86 feet

- Partially dismantled by U.S. Army (1860)- burned

- Only source for tobacco pipes and other supplements to Hudson Bay Company Employees' rations

- Previous excavations: Caywood, OAS, NPS, 2001

New Store

- Built in 1840's, previous buildings existed on site

- Building size approximately 40 x 93 feet

- Partially dismantled by U.S. Army (1860)- burned

- Housed and sold imported goods for the fur trade

- Previous excavations: Caywood

Receiving Store (1st Fur Store)

- Built in 1840's, previous buildings existed on site

- Building size approximately 40 x 100 feet

- Partially dismantled by U.S. Army (1860)- burned

- Housed imported goods for the fur trade- supplied the New Store

- Previous excavations: Caywood

Artifacts found in dump sites outside buildings

Liquor Bottle Glass

Medicine Bottle Glass

Similarities between Buildings

- These buildings were constructed in 1840's by HBC, demolished by US Army

- Buildings approximately 40 feet wide and between 86 and 100 feet in length

- All used to store and dispense goods

- Previous buildings on same site with similar uses

Artifacts found near doorways or in dump sites outside buildings

Ceramics

Tobacco Pipes

Artifacts found within a building, under where loosely placed floorboards existed

Munitions (Grapeshot)

Beads

Methodology 1970's & 2000's

- Unit sizes and measurement systems vary.

- Excavation techniques change with time and conservation ideals.

- Large discrepancy in the numbers of artifacts.

Sales Shop Units

1970

2001

1970's Sale Shop Artifact Distribution
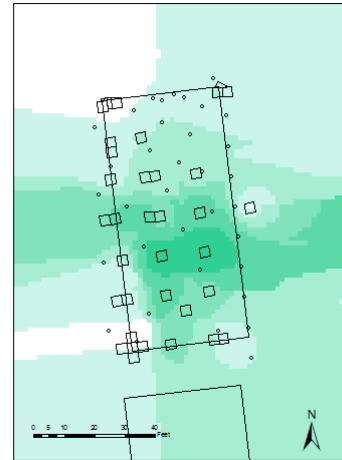## (interior artifacts)

Legend

- ○ saleshop1970spts_Merge
- ☐ Sale_Shop_2001_Units
- ☐ new store outlinecaywood
- ☐ old store outlinecaywood
- ☐ sales shop outlinecaywood

BandS70
<VALUE>

- ☐ 0.002102927 - 135.7783467
- ☐ 135.7783468 - 304.744339
- ☐ 304.7443391 - 434.4860831
- ☐ 434.4860832 - 564.2278272
- ☐ 564.2278273 - 769.4008179

2001 Sale Shop Artifact Distribution
(interior artifacts)

Legend

○ saleshop1970spts_Merge

Sale_Shop_2001_Units

new store outlinecaywood

old store outlinecaywood

sales shop outlinecaywood

BandS2001

<VALUE>

3.920280905 - 50.96365177

50.96365178 - 148.9706744

148.9706745 - 282.2602252

282.2602253 - 552.7596077

552.7596078 - 999.6716309

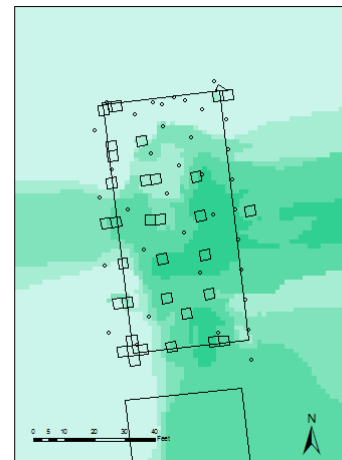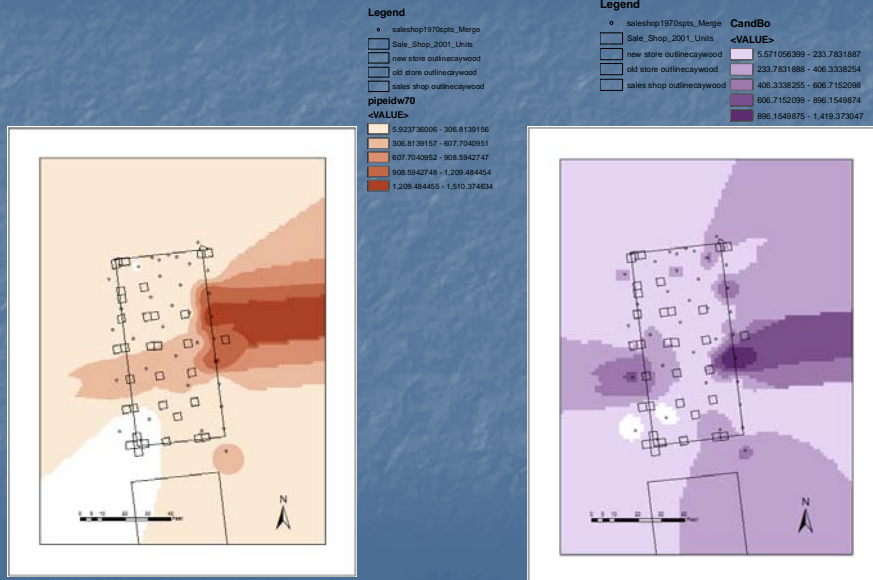1970's & 2001 Sale Shop Artifact Distribution
(interior artifacts)

Legend

○ saleshop1970spts_Merge

Sale_Shop_2001_Units

new store outlinecaywood

old store outlinecaywood

sales shop outlinecaywood

ReclassBandS702001

VALUE

1 - 2

2.000000001 - 3

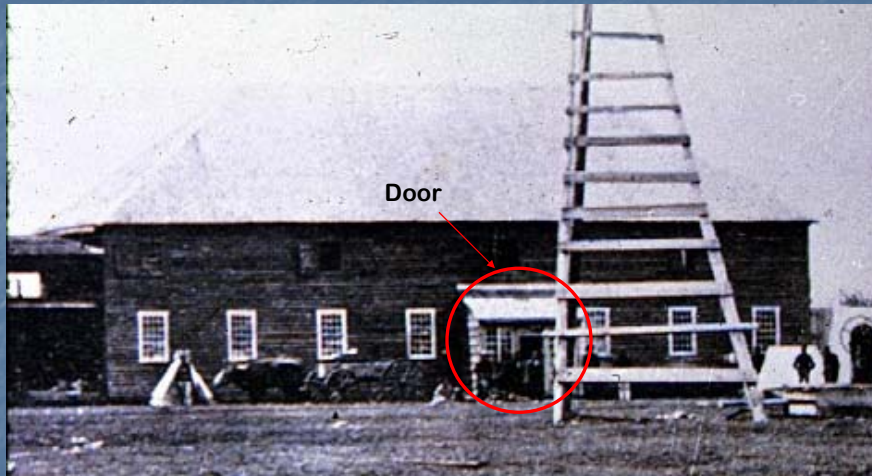3.000000001 - 4

4.000000001 - 6

6.000000001 - 10

1970's Sale Shop Artifact Distribution
(exterior artifacts)

2001 Sale Shop Artifact Distribution
(exterior artifacts)

Door

1970's & 2001 Sale Shop Artifact Distribution (exterior artifacts)

Legend

○ saleshop1970spts_Merge **reclasspipe702001**

☐ Sale_Shop_2001_Units **VALUE**

☐ new store outlinecaywood ☐ 2

☐ old store outlinecaywood ☐ 2.000000001 - 3

☐ sales shop outlinecaywood ☐ 3.000000001 - 5

☐ 5.000000001 - 7

Legend

○ saleshop1970spts_Merge **reclassC&B702001**

☐ Sale_Shop_2001_Units **VALUE**

☐ new store outlinecaywood ☐ 2

☐ old store outlinecaywood ☐ 2.000000001 - 3

☐ sales shop outlinecaywood ☐ 3.000000001 - 4
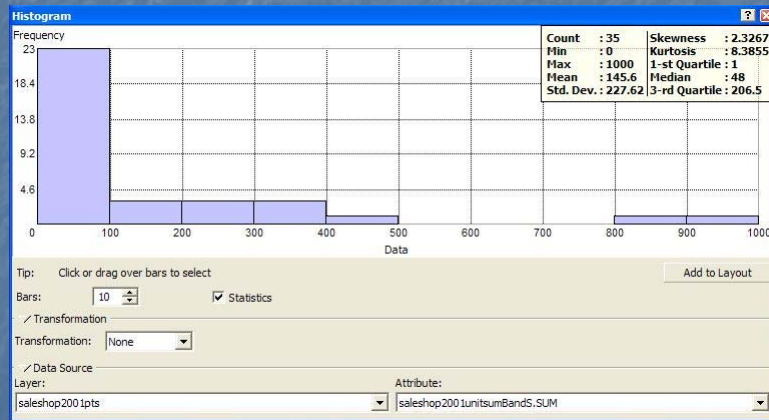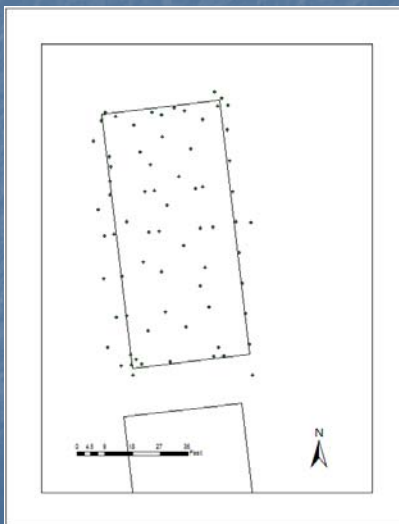
☐ 4.000000001 - 7
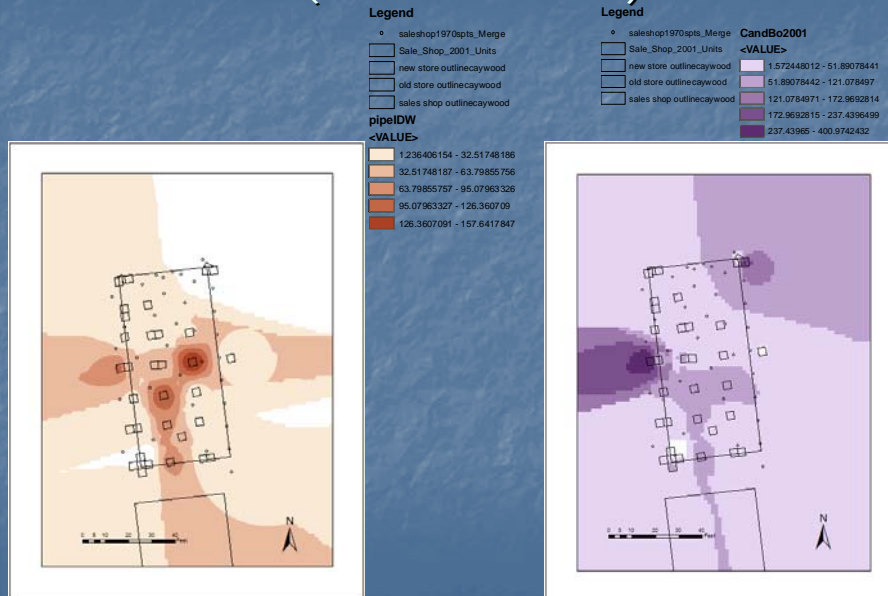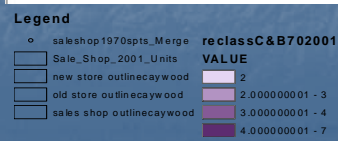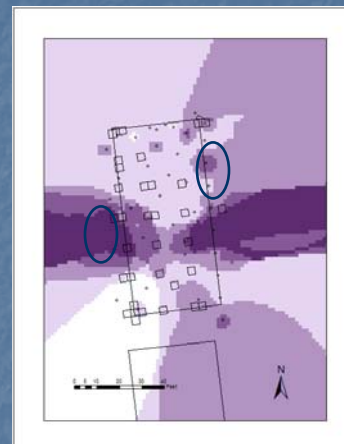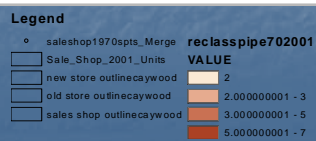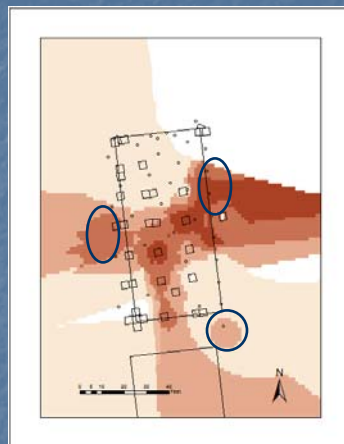
Store Doors
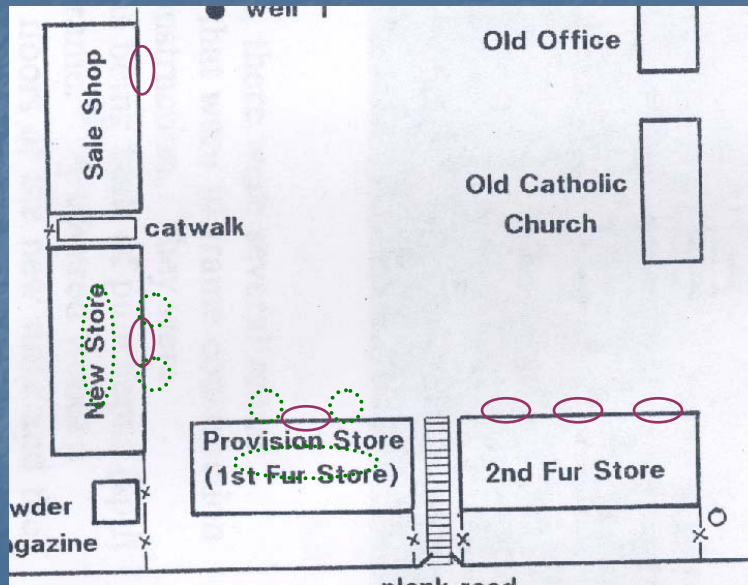
Conclusions

- There is a limitation to my knowledge of GIS and making it suit this purpose.

- I need to normalize or transform the data in a way that can be processed by GeoStatistical Analyst to create a workable model.
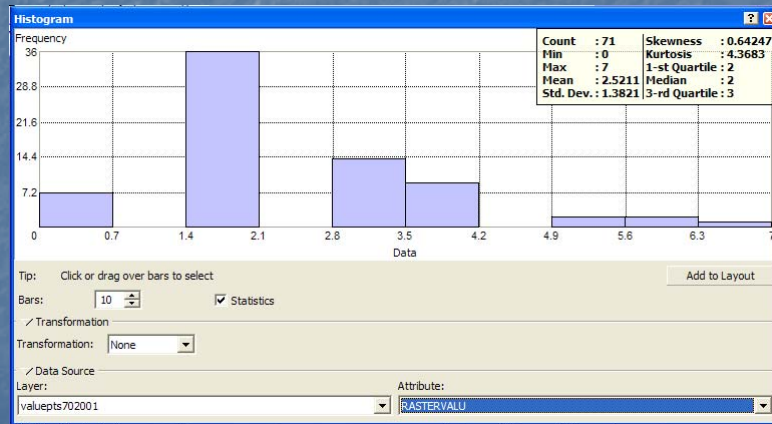
Not Normally Distributed Data

Merged All Sale Shop Points

After Extracting Point Values

Limitations, further questions

- Data available

- Excavation Unit Size

- Physical Building Differences

- Statistics

- Data Analysis of Reclassified Data

- Further Study when excavations of new buildings occur.

Questions? Comments? Suggestions?

Sources

❖ Fort Vancouver National Historic Site,
   National Park Service, Department of the Interior

❖ Fort Vancouver National Historic Site,
   Cultural Landscape Report: VI

❖ Fort Vancouver National Historic Site,
   Historic Structures Report: Historical Data V. 1