Appendix

Note: All code output below has been limited to 10 lines of output at most, in order to decrease the length of this appendix.

Installing R, RStudio, and veccompare

R is free, open-source software. It is available at (among other places) https://cran.cnr.berkeley.edu/, for Windows (available through the "base" link in the relevant page selected through the link above), MacOS (under the linked page's "Latest Release" link), and Linux (typically through one's operating system distribution's package manager).

RStudio is proprietary but freely-available software that is also available for Windows, MacOS, and Linux. It adds a graphical interface to R, and facilitates and enables features central to the veccompare package. As of this writing, is available at https://www.rstudio.com/products/rstudio/download/#download.
When installing RStudio on MacOS, users may be asked to install "Developer Tools;" users *should* install this additional set of software. In addition, RStudio may later state that it is "Finding software." This step may hang for several minutes, but will eventually complete.
After R and RStudio are installed, the user should open RStudio, click on the bottom left part of the screen, next to the ">" symbol (the "R prompt"), paste the following, and then press Enter on their keyboard:

```
install.packages("tidyverse")
install.packages("magrittr")
install.packages("veccompare")
```

This will install several extension "packages," also called "libraries," onto one's computer for use in R, using CRAN, the Comprehensive R Archive Network, a large online collection of R packages. The installation process is complete when R again shows a ">" prompt.
Veccompare comes with an RMarkdown template. Once the package is installed, anyone using RStudio can load the template through the "File… -> New File -> RMarkdown… -> From Template -> Veccompare Overlap Report" menu option, point it at their data, click a button, and generate a report on the overlap between maps (as a website, PDF document, or Word document).

Using R, RStudio, and veccompare

Note: The section directly below, "Generating a veccompare Report through RStudio Using Rmarkdown," is for readers who learn best through top-down (general to specific) examples, or who want to render a report for their own data through veccompare immediately. The following section entitled "Using R and veccompare Directly" provides an introduction to the syntax of

the R language, followed by a series of annotated code examples for loading data and then using veccompare directly. The latter section is *not needed* for users who would like to immediately use veccompare through the Rmarkdown report template that comes bundled with it. We have included those examples for readers who learn best through bottom-up (specific to general) examples.

Generating a veccompare Report through RStudio Using Rmarkdown:

The instructions below were written using RStudio version 1.1.456.

1. Prepare Rstudio:
    1. Open Rstudio, after having installed veccompare and magrittr using the instructions above.
    2. Click "File → New File… → R Markdown…"
    3. Select "From Template → Veccompare Overlap Report"
    4. Click "OK." A new file will open, based on veccompare's report template.
    5. Save the file anywhere on the user's computer.
    6. Click "Session → Set Working Directory → To Source File Location".
    7. Edit lines two through four with metadata relevant to the user. For example, "`author: "Author Name"`" could be updated to "`author: "Heather Wacha and Jacob Levernier"`."
    8. Scroll to line 22, which reads
    `vectors_to_use <- veccompare::example.vectors.list`
2. Prepare your data:
    1. Many data formats are compatible with veccompare. Here, we assume a data format somestimes used by digital humanists: a Microsoft Excel file in which each map is stored as a single column, with each place name in a separate cell:

Map A	Map B	Map C	Map D
Lorem	consectetur	magna	iaculis
ipsum	adipiscing	leo	in
dolor	elit	vel	Donec
sit	Nam	bibendum	blandit
amet	laoreet	ante	orci
	leo	laoreet	
	ante	Lorem	
		Donec	

    Here, Map A comprises five toponyms, while Map C comprises eight toponyms. Each column begins with the name of the map as a heading. **We assume that by this point, all toponyms have been manually normalized, including capitalization.**
3. In RStudio, in the tab that by default is located at the top right of the window, select the "Environment" tab. Click "Import Dataset → From Excel...".

4. Click “Browse,” and then select the Excel file saved above. A preview of the imported dataset should appear in the “Import Excel Data” window.
5. Under “Import Options:”
    1. Change “Name” to `dataset .`
    2. Check “First Row as Names”.
    3. Uncheck “Open Data Viewer”.
6. Select the code printed under Code Preview, and copy it to your clipboard. You can click the clipboard icon above the Code Preview pane to copy the code directly.
7. Click “Import.”
8. Select all of line 22 (described above), and paste the two lines copied from the Code Preview in its place.
9. Immediately below these lines, but above the three backticks (```), paste the following lines:
    ```
    library(magrittr)
    vectors_to_use <- dataset %>% as.list()
    ```
10. Click “File → Knit Document”, or click “Knit” at the top of the screen. After a few moments, during which output will show in the “Console” area of the window, an HTML report should open.
    This report is saved as an `.html` file in the same directory where the RMarkdown document is saved. You can revisit it later by opening it in any web browser.

Using R and veccompare Directly

An Overview of R

For readers who are new to R, we offer a four-point primer in the language:

```
a_fruit <- "apple"
  "Take 'apple', and save it into a variable called 'a_fruit'."

veccompare::compare.vectors()
  "Go into the 'veccompare' package and use the 'compare.vectors' command
from it."

draw_venn_diagrams = TRUE
  "Switch on the "draw_venn_diagrams" option of the command.

dataset %>%
  sort() %>%
  slice(1)
"Take the dataset,
  and then apply the 'sort' command to it,
  and then apply the 'slice' command to that to get the first row."
```

Loading data

Although we could have a copy of a dataset saved on our local machine, we can also get the latest version of the *mappamundi* dataset described in this article from a GitHub repository that stores it.

```
# Load "packages"" (also called "libraries"). For each of these packages, one must have previously run install.packages("name_of_that_package") once on one's computer to download them and make them able to be used.
library("dplyr")
library("pander")
library("purrr")
library("readr")
library("veccompare")

# Load the dataset from its repository on GitHub:
dataset <- readr::read_csv(
  "https://raw.githubusercontent.com/publicus/medieval-mappamundi/master/data/untidy/mappamundi_combined_untidy.csv",
  na = "") %>%
  dplyr::select(-`Map Name`)

# Create a list of maps, by selecting which columns to use from the datset loaded above:
vectors_to_use <- list(
  "Psalter Pictorial Map" = dataset %>% pull(`Psalter Pictorial Map - Normalized`),
  "Psalter List Map" = dataset %>% pull(`Psalter List Map - Normalized`),
  "Munich Isidore Map" = dataset %>% pull(`Munich Isidore Map - Normalized`),
  "Descriptio HSV Map" = dataset %>% pull(`HSV Descriptio mappa mundi - Normalized`),
  "Lambert de Saint Omer Map" = dataset %>% pull(`LSO Liber Floridus - Normalized`),
  "Cotton Map" = dataset %>% pull(`Cotton Map - Normalized`),
  "BL Royal Map" = dataset %>% pull(`BL Royal 14.C IX Higden Map - Normalized`),
  "Chronicon HSV Map" = dataset %>% pull(`HSV Chronicon - Normalized`),
  "Sawley Map" = dataset %>% pull(`Sawley Map - Normalized`),
  "Hereford Map" = dataset %>% pull(`Hereford Map - Normalized`)
) %>%
  purrr::map(function(x) {
    na.omit(x) %>%
      as.character()
    })
```

Information about the maps

We can use the `compare.vectors` command to compute a 2-way comparison between, for example, the Cotton (BL Cotton Tiberius B.v, f. 56v) and Psalter Pictorial (BL Add MS 28681) maps.

```r
# Compare the two maps, and save the comparison to a variable called
cotton_and_psalter:
cotton_and_psalter <- veccompare::compare.vectors(
  vectors_to_use[c("Cotton Map", "Psalter Pictorial Map")],
  degrees_of_comparison_to_include = 2,
  draw_venn_diagrams = TRUE
)

# The compare.vectors command returns several pieces of information to us. We
can see the names of those pieces of information here:
cotton_and_psalter %>%
  magrittr::extract2(1) %>%
  names()
```

```
## [1] "elements_involved"                "union_of_elements"
## [3] "overlap_of_elements"              "elements_unique_to_first_element"
## [5] "venn_diagram"
```

The output from this command includes information about several elements:

1. The maps that we are comparing (here, the Cotton and the Psalter Pictorial maps).
2. The "union" of elements. If we looked into this element, we would see the deduplicated, combined list of all places across both of the maps being compared and this is tied to the code 1b described above.
3. The "overlap" of elements. If we looked into this element, we would see the deduplicated list of elements that are present in both maps being compared.

We can examine the overlap of elements using the `extract.compared.vectors` command, specifying that we would like to see information from the `overlap_of_elements` element.

```r
# What are the overlapping elements between the two maps?
cotton_and_psalter %>% veccompare::extract.compared.vectors(
  degrees_of_comparison = 2,
  elements_of_output = "overlap_of_elements"
) %>%
  purrr::map(sort)  # Sort the list above
```

```
## $overlap_of_elements
##  [1] "alexandria in egypto c." "antiochia"
##  [3] "arca noe"                "armenia"
##  [5] "asia minor"              "atlas m."
##  [7] "bethlehem"               "britannia"
##  [9] "cartago in africa"       "cinocephales"
##  [ reached getOption("max.print") -- omitted 23 entries ]
```

Moving on, we can compare two other maps from the dataset, examining which elements are unique to each. We can combine the list of unique place names from each map, resulting in a combined list of non-overlapping place names.

```r
# Items unique to each of two maps, in one chained command:
veccompare::compare.vectors(
```

```
  vectors_to_use[c("Sawley Map", "Hereford Map")],
  degrees_of_comparison_to_include = 2,
  draw_venn_diagrams = TRUE
) %>%
  veccompare::extract.compared.vectors(
    degrees_of_comparison = 2,
    elements_of_output = "elements_unique_to_first_element"
  ) %>%
  magrittr::extract2(1) %>%
  purrr::map(sort) %>%  # Alphabetize the output
  unlist() %>% as.character() %>% sort()  # Combine the lists, and re-
alphabetize the combined lists.

##  [1] "abana fl."      "abarim m."      "aberdene"       "abidos c."
##  [5] "abisaris r."    "accon"          "achillea"       "acrocerauni m."
##  [9] "adanum i."      "adiabeni"
##  [ reached getOption("max.print") -- omitted 874 entries ]
```

The `compare.vectors` command works for comparisons between any number of maps; below, we use it to answer the question, "Which place names are found in all ten maps in the dataset?" The answer is three toponyms: "hibernia," "sicilia," and "roma."

```
# An example 10-way comparison, saved to a variable called
ten_way_comparison:
ten_way_comparison <- veccompare::compare.vectors(
  vectors_to_use,
  degrees_of_comparison_to_include = 10,
  draw_venn_diagrams = FALSE
)

# What overlaps between all 10 maps?
ten_way_comparison %>%
  veccompare::extract.compared.vectors(
    elements_of_output = "overlap_of_elements"
  )

## $overlap_of_elements
## [1] "hibernia" "sicilia"  "roma"
```

We can create a report using the `compare.vectors.and.return.text.analysis.of.overlap` command, which takes the output of the `compare.vectors` command, adds contextualizing headings and other text around it, and returns a markdown-formatted block of text. This report-generating feature is demonstrated further below. It is mentioned here first to introduce that veccompare offers visualization capabilities.

There are three different visualizations that are included in the default report. All are demonstrated in the full demonstration report below.

Veccompare builds on the `VennDiagram` package for R, which can draw diagrams for up to five-way comparisons. We can render a Venn diagram using the `render.venn.diagram` command.

A helper command, `extract.compared.vectors`, facilitates extracting specific elements across comparisons from the output.

```
# Take our original comparison variable, which we saved above, and create a
venn diagram from it:
cotton_and_psalter %>% veccompare::extract.compared.vectors(
  degrees_of_comparison = 2,
  elements_of_output = "venn_diagram"
) %>%
  magrittr::extract2("venn_diagram") %>%
  veccompare::render.venn.diagram()
```

Figure 2. Venn diagram showing toponym overlap between the Psalter Pictorial and Cotton maps.

```
# List all of the elements, across maps, involved in the comparison:
cotton_and_psalter %>% veccompare::extract.compared.vectors(
  degrees_of_comparison = 2,
  elements_of_output = "union_of_elements"
)

## $union_of_elements
##  [1] "verona"    "islandia"  "philistea" "nineveh"   "eudemon"
##  [6] "luna"      "aracusia"  "macedonia" "india"     "salerna"
##  [ reached getOption("max.print") -- omitted 275 entries ]
```

Using an additional command, `summarize.two.way.comparisons.percentage.overlap`, veccompare can produce a table, plot, or network graph showing overlap between all two-way comparisons.

```
# Create a network graph of all two-way comparisons of maps:
veccompare::summarize.two.way.comparisons.percentage.overlap(
    vectors_to_use,
    output_type = "network_graph",
    network_graph_minimum = 0.20  # This could be changed, e.g., to 0.5
)
```

Figure 6a. Network table showing percentage of overlap above 20% between all ten maps in the dataset.

This network graph shows, using node size, that the Descriptio (Map #4) and the Hereford (Map #5) have the most elements of the maps in the dataset. It further shows, in its connection-lines ("edges"), that the other maps in the dataset tend to overlap heavily with those two large maps This network graph currently shows overlap connections whenever a map overlaps at least 20% with another map. We can make the map less dense by increasing that threshold to 50%, such that only map-connections of at least 50% are drawn in the network graph.

```
# Create a network graph of all two-way comparisons of maps:
veccompare::summarize.two.way.comparisons.percentage.overlap(
    vectors_to_use,
    output_type = "network_graph",
    network_graph_minimum = 0.50
)
```

Figure 6b. Network table showing percentage of overlap above 50% between all ten maps in the dataset.

Generating a Report with veccompare

As noted above, veccompare can generate reports using the compare.vectors.and.return.text.analysis.of.overlap command. Example code, from the veccompare RMarkdown template, is reproduced with its output below.

```
veccompare::compare.vectors.and.return.text.analysis.of.overlap(
    vectors_to_use,
    degrees_of_comparison_to_include = c(1),
    cat_immediately = TRUE,
    viewport_npc_width_height_for_images = 0.7,
    base_heading_level_to_use = 2
)
```

Example Output from a veccompare Report

The text below, to the end of this Appendix, is example output from a veccompare report.

Number of Items in Each Element

BL Royal Map

- Total number of values (not counting duplicates): 267

Chronicon HSV Map

- Total number of values (not counting duplicates): 353

Cotton Map

- Total number of values (not counting duplicates): 151

Etc.

2-Way Comparisons

The two-way comparisons can be summarized visually and tabularly in several ways.

First, we present a matrix showing decimal percentage overlap (i.e., “0.23” means “23%”) between each pair of maps. This table is intended to be read with row names first, in this form:} *“[row title] overlaps with [column title] [cell value] percent.”*

```
veccompare::summarize.two.way.comparisons.percentage.overlap(
    vectors_to_use,
    output_type = "matrix_plot"
)
```

Figure 5. Graph in table format from veccompare showing 2-way comparisons.

The table above can also be read in the form below (reading across each row: *[column one] overlaps with [column two] [column three] percent.* As above, we present decimal percentages (i.e., “0.23” means “23%”):

```
pander::pandoc.table(
    veccompare::summarize.two.way.comparisons.percentage.overlap(
        vectors_to_use,
        output_type = "table",
        melt_table = TRUE
    ),
    split.cells = 15,
    split.tables = Inf,
    justify = c('center'),
    style = 'multiline'
)
```

Vector_Name	Overlaps_With	Decimal_Percentage
Psalter List Map	Psalter Pictorial Map	0.33
Munich Isidore Map	Psalter Pictorial Map	0.19
Descriptio HSV Map	Psalter Pictorial Map	0.12
Etc.		

We can now compute all comparisons between the vectors. For this demonstration, the generated report is limited to up to five-way comparisons (vs. to six- through 10-way comparisons).

```
# We can now get all comparisons between the vectors:

veccompare::compare.vectors.and.return.text.analysis.of.overlap(
    vectors_to_use[1:5],
    degrees_of_comparison_to_include = 2:5,
    cat_immediately = TRUE,
    draw_venn_diagrams = TRUE,
    viewport_npc_width_height_for_images = 0.65, # If venn diagrams are
getting cut off, this number can be lowered (for example, to 0.7)
    base_heading_level_to_use = 1
)
```

2-Way Comparisons
Below is one example. A full report would include all two-way comparisons:

Psalter List Map and Psalter Pictorial Map

Figure 7. Venn diagram from veccompare showing overlap between the Psalter Pictorial and Psalter List maps.

- Total number of values (not counting duplicates): 257
- Total number of elements that **overlap among Psalter List Map and Psalter Pictorial Map:** 44 (17.12% of the total number of values)
  - Items that **overlap among Psalter List Map and Psalter Pictorial Map:** *persia, siria, armenia, creta, sicilia, hyrcania, jazaron, persepolis, carras, antiochia, jerusalem, troia, parthan in albania c., calcedonia c., elam, asia maior, asia minor, nineveh, bethlehem, azotus, egyptus, alexandria in egypto c., sithe, memphis, ethiopia, nathabres, capadocia c., grecia, achaia, dalmatia, hispania, aquitania, saxonia, britannia, hibernia, scotia, norwegia, zeugis r., cartago in africa, getulia, mauritania, cesarea in palestine, atlas m., and roma*

Elements Unique to Psalter List Map

Total number of elements that are **unique to Psalter List Map:** 90 (67.16% of Psalter List Map; put differently, 32.84% of Psalter List Map is overlapping)

Items that are **unique to Psalter List Map:**

> *india, parthia r., media r., africa, mesopotamia, chaldea, arabia, judea, galilea, samaria r., palestina, frigia, nicomedia, albania, cyprus, licaonia, capadocia r., scythia superiore, scythia inferiore, aracusia, meda, thesia, edessa, philadelphia, nazareth, sagasta, ascalon, ilium, bithynia, paphos, hecatompolis, iconium c.?, syracuse, susa c.?, sebastea in palestina, archimedon, susis, babilonia c., damascus, capernaum, tarsus, cilicia, ephesus, catania, abidos c., gangara, padaum c., europa, tracia r., boeotia, dardania, lacedemonia r., thessalia, thessalia minor, italia, apulia, campania, galicia, wasconia, pictavia r., neustria, francia, alemannia, dacia, suevia, gothia, bulgaria, wandalia r., germania, pannonia, moesia, gallia belgica, belgis c., libia, cirene, ethiopia ulterior, saba, numidia, hippo c., tingitania, tingis, ethiopia occidentalis, gades, ethiopia orientalis, burdigala, londonia, cantuaria, dublina, armachus, and sancti andree c.*

Elements Unique to Psalter Pictorial Map

Total number of elements that are **unique to Psalter Pictorial Map:** 123 (73.65% of Psalter Pictorial Map; put differently, 26.35% of Psalter Pictorial Map is overlapping)

Items that are **unique to Psalter Pictorial Map:**

> *albania inferior, amazones g., albania superior, coromarces r., lachis, accon, chorazin, bethsaida, tiberias, licia, cyropolis, safris, sarina?, nisibi, polibota, jericho, theodosipolis,*

octogora c., hermus fl., cintilis fl., riphei m., oscobares m., libani m., excelsus m., ganges fl., syon m., dan fl., jor fl., torrens cison, stannum, gennesar l., mortuum mare, euphrates fl., tigris fl., gorgades i., are liberi, columpne herculis, are alexandri, arbor solis, arbor lune, turris babilon?, puteus josep, arumphei, albatia i., arca noe, larissa, constantinopolis, galatia, normannia, burgundia, lugdunum, scythia, sarmatica r., ruscia, slavenia occidentalis, hyperborea g., britannia minor, hungaria, macedonia, calipso i., mare, barcinona, terracona i., parisius, bolonia, colonia, saale, phison, danubius fl., volga fl., suevus m., cornubia, wallia, alexandria r., geon fl., damietta, saltabri, pelusium c., daphnai, babilonia r., heliopolis, garema, nilus, meroe i., monasterium sancti petri, horrea josep, berenice in libia c., terra arenes et sterilis, are philenorum, transitus hebreorum, pirenei m., rubrum mare, persicus s., nubie m., alpes, murus alexandri, paradisus, amyctreae, ora conserta g., monoculi, marmini, blemmye, oculos in humeris, trogodite, artobatitis, psambari, cinocephales, sine naribus, phanesii, anthropophagi, auster v., septentrio v., subsolanus v., zephirus v., euronothus v., aufricanus v., eurus v., wulturnus v., circius v., aquilo v., libonothus v., chorus v., and nothus v.

3-Way Comparisons

Below is one example. A full report would include all three-way comparisons:

Descriptio HSV Map, Psalter List Map, and Psalter Pictorial Map

Figure 4a. Venn diagram from veccompare showing a 3-way comparison.

- Total number of values (not counting duplicates): 1016
- Total number of elements that **overlap among Descriptio HSV Map, Psalter List Map, and Psalter Pictorial Map:** 38 (3.74% of the total number of values)
  - Items that **overlap among Descriptio HSV Map, Psalter List Map, and Psalter Pictorial Map:** *achaia, alexandria in egypto c., antiochia, aquitania, armenia, asia maior, asia minor, atlas m., azotus, bethlehem, britannia, calcedonia c., capadocia c., cartago in africa, cesarea in palestine, carras, creta, dalmatia, egyptus, elam, ethiopia, getulia, grecia, hibernia, hispania, jerusalem, mauritania, memphis, nineveh, persia, persepolis, roma, saxonia, sithe, scotia, sicilia, siria, and zeugis r.*

Elements Unique to Descriptio HSV Map

Total number of elements that are **unique to Descriptio HSV Map:** 759 (80.92% of Descriptio HSV Map; put differently, 19.08% of Descriptio HSV Map is overlapping)

Items that are **unique to Descriptio HSV Map:**

abarim m., abidos i., abricatina, actia nicopolis, acrocerauni m., adanum i., adrianopolis, adriaticus s., africa catharginensis, africa minor, africa numidiana, aginno, aglos, agregentum, airoth, alania, alba, albani, albanicus o., albula, castra alexandri, columpne alexandri, alpes gothice, amana, amandros, amazonia r., ambianis, ancona, andegavis c., anglia, ansaga fl., antopolis, apallina i., apamia, apollonia c., appennini m., aquileia, aquilonalis o., aquis, ara, arab, eudemon, arach, araris fl., ararat m., arausica, araxis fl., archad, arcadia, archipoleta

lacus, ardennes, arelatum, argentora, argus, argire, arimaspi, ariobaranes m., armenia inferior, armenia superior, arsinoe, avernia r., avernis c., asia, asiaticum mare, aspides, assiria, astrixis m., athandros, athena, atrebatum, attica, avenna m., augusta, augustudunus, aulon cilicus, aulona, aureus m., aurelianis, auseium, australis o., austria, autisiodorum, axona fl., aves, babilon c., bactria r., bactria c., bactrus fl., bagrada fl., baioaria, baiogas c., baleares i., balearicum m., maiorca, minorca, bar, basidim, basilea c., basilicus, batavia, berenice p., belvagus, beneventum, beroe, bethania, bethel, bethoron, baetica, baetis fl., birete, bituris c., bituriges r., bizacium c., bizantium, bizacena, bogdada, bonacon, bononia francia, bononia italia, boreus fl., boreus c., bosphorus, bosos, bracara c., bragmania r., bragmania c., bragmani g., brigantia, britannicum m., britannicus s., brucii, brixia, brixon fl., brundisium, burgundiones, cabilones, cadurx, calabria r., calaminica, chalearsus lacus, calpes m., cameleopardus, cameracus, campi c., canaria i., canopus i., catabathmon m., cantabria, cantabricus s., capria i., capsa colim, capua, cariz m., caralitani, caria, carmea, carmelus c., carmelus m., carnotum, carpatium mare, carpatos i., carra, carthagensis mare, caspie p., caspium mare, caspius m., catalonia, cathmorum, caucasus m., cedar, cenneret, cenomanis, centumcellis, cerastes, ceronia, cersona, cervi, cesar augusta c., cesarea in capadocie, cesarea philippi, cesaria in mauritania, ceutria, chadesbarne, cana, chios, chobar fl., colchos i., choos, cyclades, cidnus fl., cilicus s., cimera m., cimericum mare, cinopodes, circapolis, cisame, citherea i., clarus m., claudiopolis, climax m., clipea, coaspis, cocadrillus, colubraria i., commagena, constantia, convenarum, corcyra, cordoba, corinthus c., cornelli forum, cornicularia, corsica, cosium, crise, cristoas, cucim c., cyprium mare, delminium c., danaper fl., dara fl., decusa, delos i., delphi, delsephon, derbant, didime i., dioscorus, dirracium, domin, donimus, dordonia, dorstedas, dravus fl., draco, durentia, durius, eborica, ebos fl., ebusus i., echbatanis, ctesiphon, edua, aegeum mare, egyptus d., egyptus plana, egyptium mare, egyptus inferior, egyptus superior, elamite, elefantes, hellada, hellespontus, emaus, emerita, emilia, moisselon emporium, engloisma, enoch, enon, eous o., epiphania, epiroea, epirus, equinus, eraclea in asia minor, eraclea in boeotia, eraclea in pannonia, eraus, erea, eridanus, ericusa i., erimantus, hesperia c., hesperidum i., ethiemens, ethiopia egyptus, ethiopia india, etruria, euxinus pontus, euxis fl., evilath, evonia, exargus, farat, farus, fasidis, fauni, fenicus i., ferrea, festia, flaminia, fontes, formica, fortunate, forum julii, franci g., frigia maior, frigia minor, frisia, futensis, futh, gaditanum fretum, galathe, galgala, galigardamena, galli g., gallia, gallia celtica, gallia cisalpina, gallia narbonensis, gallia transalpina, gallicum mare, galloreci, gangarida, gangines ethiopes, garamantes, gargala, garonna, gaudonia, gaulonum i., gaza, gazari g., gehenna, gelboe m., geloni, gennabus, gethsuri, gigantes, gog, goren, gorgoneos, gortina, gratianopolis, grifes, guisara, gutalas, hadrumetum, hai, helles fl., helvetii, heriforum, hermon m., hiberia inferior, hiberia superior, hibericum mare, hiberis fl., hyrcani g., hispanicum mare, bicipites, carent linguis g., quatuor oculos, labro prominente g., qui nunquam igne utuntur, qui se in mare precipitant, sine capite, solis carnibus viventes, horeb m., hrohes, hus, hylerdis c., hyperboreus, hyrcania inferior, hyrcania superior, hystmos, histria, jaculus, iadera, janua, icarium mare, iconium c., ictiofagorum i., idumea, illiricum r., illiricus s., imolas, incubi, indicus o., indus fl., iona fl., ionium mare, ioppe, jor fons, jordanis fl., junonia, juranus, canusius, lacedemonia c., langlaria, laodicia, lanius, lates fl., laudunus, leapitina, lebraha, lecenna, lemannus fl., lemovica, leodium, leones, leptis, lesaria, letheus fl., leucaton, leuti p., libia africana, libia cirenensis, libia ethiopes, libia pentapolis, libicum mare, libie d., liburnia r., liburnicus s., lidia, ligeris fl., liguria, liguricus s., lilibeum, lingonum, listra, lixus c., lixus fl., lorum, lotharingia, lucania, luceria, luceni, luxovium, liparis i., macedonicus s., magdalus c., grecia magna, magnum mare, magog, magolona, magontia, malichu i., malva fl., mantua, manticora, mara, marcomanni, margus, maroch, martionopolis, massilia, matisconum, matrona, mauritania cesariensis, mauritania sitifensis, mauritania tingitana, mauritanicum mare, meander, mediolanum, mediomatricum c., megara, meldis, melena, melita, melos i., memarmoli m., membriona, menapi, menela c., menelaus m., meotides paludes, messana, messia i., messia c., messicus s., metis, metona, mevania, miletus, mineus fl.,

mirteum mare, mogona, monasteria monachorum egyptiorum, monopodes, cassinus m., morini, mosa fl., mosella, nabath, nadaver, nametis, nani, narbona c., narbonensis r., nasamones, noxon, neapolis, neamusium, nicaea, nicopolis, nuchul fl., nisa, nivaria i., nivernis, noricus, noviomus, nubie p., nubii g., numides g., numidicus s., nursia, occea, occhus, occidentalis o., octogora fl., olympia c., olympus m., oliveti m., onagri, orcades i., organus, orientalis o., ortigia, oruns, oximus, pachinum, pactolus fl., padus fl., pamphilium mare, pamplona, pandea g., panisus, panorma, panotii, pantaris c., panther, papia, par, paranda, parchoatras m., paretonium, parma, paros, parthan in armenia c., parthia in parthia c., pathmos, patras, pelorum m., pelusium fl., pelusium s., bergomum, pergamus, perusium, pestum, petra, phatures, phenicia, phenicis mare, piscinus, pictavis c., pigmei, pisa, piscaria fl., pitavium, placentia, poros, prester, prochenissa i., propontis mare, provincia r., prusias c., psilli, ptolomais, punici, ramesses, ransburg, ravenna, reate, redonis, regium, remis, retia, retia maior, retia minor, renus fl., rodus, rodanus fl., robasci, rothomagum, rupis, ruthupi portus c., ruthenus c., savus fl., sabrata, sagagdan, sagiensis, sagitarii, sagomna, sala c., sala fl., salamina, saldis c., sale c., salerna, saline, salmon, saltus, samara m., samo fl., samos i., sancti jacobi c., santonum, sannium, sardinia, sardinicum mare, sardis, sardum mare, sarepta, sarmathana c., sarraceni nabatehi, satyri, saxones, scaldus, scena fl., scinize, scythiopolis, scorpiones, scupis, sebastia in egypto, sebastia pentapolis, seyr m., seleucia in siria, seleucia in mesopotamia, senogallia, senonis, septem oppidum, septentrion o., sequana fl., sequani, seres c., sericus mare, serpentes, sessia, sestos c., sichem, siculum, sidon i., sigau, siler fl., silvanectum, sinnada, sipontus, siracusa, siraph, sirtes, sitifis c., sochoth, soloe, somena, spoletum, stoecades, strasburg, stridonis i., strimon fl., stripodes, strongile, subentani, suessionum, sidon c., sina m., syrmium, sirtes minores, tabraca, tagapi, tagus fl., taprobana, tapson i., tarentus, tarvenna, tatus c., tauri, tarominitani, taurus m., tea, templum ammonis, tenedos i., theode, tabor m., tafnis c., tanais fl., thanatos, thebe in egypto, thebe in boeotia, theodosia, terasia, thessalonica, teutonica, timavus m., temiscerii campi, toglit, tolosa, tornacus, tragata, tragelafi, trecas, treodenus, treveris c., tripolitana r., triton fl., tuburbis, tuburbitani, tudertina, tullo, tungris, turchi, turonis, turris in sardinia, tuscia, tussa, tyatira c., tiberis fl., tybut, tycinum, tigris r., tyle, tylos, tyrenum mare, tyrus, ulbienses, ulca, umbria r., unicornes, ursi, valencia, valeria, varunna, velabri g., venetia, vensura, veredunus, verona, vesulus m., vicenus, vienna, vincentia, vulcano i., wandali g., warmatia, waconia, icaria i., idri marini, himantipodes, inachus fl., ipodes, hippo r., hipotami, isara fl., isauria, zimus, zmirna, boreus v., euroauster v., austerafricus v., and africus v.

Elements Unique to Psalter List Map

Total number of elements that are **unique to Psalter List Map:** 26 (19.4% of Psalter List Map; put differently, 80.6% of Psalter List Map is overlapping)

Items that are **unique to Psalter List Map:**

samaria r., meda, thesia, sagasta, hecatompolis, iconium c.?, syracuse, susa c.?, babilonia c., catania, gangara, padaum c., dardania, thessalia minor, wasconia, pictavia r., bulgaria, belgis c., ethiopia ulterior, hippo c., tingitania, londonia, cantuaria, dublina, armachus, and sancti andree c.

Elements Unique to Psalter Pictorial Map

Total number of elements that are **unique to Psalter Pictorial Map:** 46 (27.54% of Psalter Pictorial Map; put differently, 72.46% of Psalter Pictorial Map is overlapping)

Items that are **unique to Psalter Pictorial Map:**

amazones g., coromarces r., lachis, cyropolis, sarina?, cintilis fl., excelsus m., jor fl., torrens cison, stannum, are liberi, arbor solis, arbor lune, turris babilon?, puteus josep, albatia i., arca noe, slavenia occidentalis, hyperborea g., hungaria, mare, bolonia, saale, phison, volga fl., cornubia, wallia, alexandria r., damietta, saltabri, daphnai, monasterium sancti petri, terra arenes et sterilis, transitus hebreorum, nubie m., murus alexandri, paradisus, amyctreae, monoculi, oculos in humeris, phanesii, euronothus v., aufricanus v., aquilo v., libonothus v., and nothus v.

4-Way Comparisons

Below is one example. A full report would include all four-way comparisons:

Descriptio HSV Map, Munich Isidore Map, Psalter List Map, and Psalter Pictorial Map

Figure 4b. Venn diagram from veccompare showing a 4-way comparison.

- Total number of values (not counting duplicates): 1045
- Total number of elements that **overlap among Descriptio HSV Map, Munich Isidore Map, Psalter List Map, and Psalter Pictorial Map:** 13 (1.24% of the total number of values)
  - Items that **overlap among Descriptio HSV Map, Munich Isidore Map, Psalter List Map, and Psalter Pictorial Map:** *antiochia, aquitania, atlas m., bethlehem, cartago in africa, creta, hibernia, hispania, jerusalem, nineveh, roma, scotia, and sicilia*

Elements Unique to Descriptio HSV Map

Total number of elements that are **unique to Descriptio HSV Map:** 616 (65.67% of Descriptio HSV Map; put differently, 34.33% of Descriptio HSV Map is overlapping)

Items that are **unique to Descriptio HSV Map:**

abarim m., abidos i., abricatina, actia nicopolis, adanum i., adriaticus s., africa catharginensis, africa minor, africa numidiana, aginno, aglos, agregentum, airoth, alba, albani, albanicus o., albula, alpes gothice, amana, amandros, ambianis, ancona, andegavis c., antopolis, apallina i., apamia, apollonia c., appennini m., aquileia, aquilonalis o., aquis, ara, arab, eudemon, arach, arausica, archad, arcadia, ardennes, argentora, argus, arimaspi, armenia inferior, arsinoe, avernia r., avernis c., asia, asiaticum mare, aspides, assiria, athandros, atrebatum, attica, avenna m., augusta, augustudunus, aulon cilicus, aulona, aureus m., aurelianis, auseium, australis o., austria, autisiodorum, axona fl., aves, bactria r., bactrus fl., baioaria, baiogas c., baleares i., balearicum m., maiorca, minorca, bar, basidim, basilea c., basilicus, batavia, berenice p., beneventum, bethania, bethel, bethoron, baetica, baetis fl., birete, bituris c., bituriges r., bizantium, bizacena, bogdada, bonacon, bononia francia, boreus c., bosos, bracara c., bragmania r., bragmania c., bragmani g., brigantia, britannicum m., britannicus s., brucii, brixia, brixon fl., brundisium, burgundiones, cabilones, cadurx, calabria r., calaminica, chalearsus lacus, calpes m., cameleopardus, cameracus, campi c., canaria i., catabathmon m., cantabria, cantabricus s., capria i., capsa colim, capua, cariz m., caralitani, caria, carmea, carmelus c., carmelus m., carnotum, carpatos i., carthagensis mare, caspius m., catalonia, cedar,

cenneret, cenomanis, centumcellis, cerastes, ceronia, cervi, cesarea in capadocie, cesaria in mauritania, ceutria, chadesbarne, cana, chobar fl., cyclades, cidnus fl., cimera m., cinopodes, circapolis, cisame, citherea i., clarus m., claudiopolis, climax m., clipea, coaspis, cocadrillus, colubraria i., commagena, constantia, convenarum, cornelli forum, cornicularia, corsica, cosium, cristoas, cucim c., delminium c., danaper fl., delos i., delphi, delsephon, derbant, didime i., dioscorus, domin, donimus, dordonia, dorstedas, draco, durentia, durius, eborica, ebos fl., echbatanis, edua, egyptus plana, egyptus inferior, egyptus superior, elamite, elefantes, hellada, emaus, emerita, emilia, moisselon emporium, engloisma, enon, epiphania, epiroea, epirus, equinus, eraclea in asia minor, eraclea in pannonia, eraus, eridanus, ericusa i., erimantus, ethiemens, ethiopia egyptus, ethiopia india, etruria, euxinus pontus, evilath, evonia, exargus, farat, farus, fasidis, fauni, flaminia, fontes, formica, forum julii, franci g., frigia maior, frigia minor, frisia, futensis, futh, galathe, galgala, galigardamena, galli g., gallia celtica, gallia cisalpina, gallia narbonensis, gallia transalpina, galloreci, gangarida, gangines ethiopes, garamantes, gargala, garonna, gaudonia, gaza, gazari g., gehenna, gelboe m., geloni, gennabus, gethsuri, gigantes, gog, goren, gortina, gratianopolis, grifes, guisara, gutalas, hadrumetum, hai, helles fl., helvetii, hermon m., hiberia inferior, hiberia superior, hibericum mare, hiberis fl., hyrcani g., hispanicum mare, bicipites, carent linguis g., quatuor oculos, labro prominente g., qui nunquam igne utuntur, qui se in mare precipitant, sine capite, solis carnibus viventes, horeb m., hrohes, hus, hylerdis c., hyperboreus, hystmos, histria, jaculus, iadera, janua, icarium mare, iconium c., ictiofagorum i., idumea, illiricum r., imolas, incubi, indicus o., iona fl., jor fons, junonia, juranus, canusius, lacedemonia c., langlaria, laodicia, lanius, lates fl., laudunus, leapitina, lebraha, lecenna, lemovica, leodium, leones, leptis, lesaria, letheus fl., leucaton, leuti p., libia africana, libia cirenensis, libia ethiopes, libia pentapolis, libicum mare, libie d., liburnia r., lidia, ligeris fl., liguria, lilibeum, lingonum, listra, lixus fl., lotharingia, lucania, luceria, luceni, luxovium, magdalus c., grecia magna, magnum mare, magog, magolona, malichu i., malva fl., mantua, manticora, mara, marcomanni, margus, maroch, martionopolis, massilia, matisconum, matrona, mauritania cesariensis, mauritania sitifensis, mauritania tingitana, mauritanicum mare, meander, mediomatricum c., megara, meldis, melena, melita, melos i., membriona, menapi, menela c., menelaus m., messana, messia i., messia c., metis, metona, mevania, miletus, mineus fl., mogona, monopodes, cassinus m., morini, mosa fl., mosella, nabath, nadaver, nametis, nani, narbona c., narbonensis r., nasamones, noxon, neapolis, neamusium, nicaea, nicopolis, nivaria i., nivernis, noricus, noviomus, nubie p., nubii g., numides g., numidicus s., nursia, occea, occhus, occidentalis o., octogora fl., olympia c., olympus m., oliveti m., onagri, orcades i., organus, orientalis o., ortigia, oruns, oximus, pachinum, pactolus fl., padus fl., pamphilium mare, pamplona, pandea g., panisus, panorma, panotii, pantaris c., panther, papia, par, paranda, parchoatras m., parma, parthan in armenia c., parthia in parthia c., patras, pelorum m., pelusium fl., bergomum, pergamus, perusium, pestum, petra, phatures, phenicia, phenicis mare, piscinus, pictavis c., pigmei, pisa, piscaria fl., pitavium, placentia, poros, prochenissa i., prusias c., psilli, ptolomais, punici, ramesses, reate, redonis, regium, retia, retia maior, retia minor, robasci, rupis, ruthupi portus c., ruthenus c., sabrata, sagagdan, sagiensis, sagitarii, sagomna, sala c., sala fl., salamina, saldis c., sale c., salerna, saline, salmon, saltus, samara m., samo fl., sancti jacobi c., santonum, sannium, sardinicum mare, sardis, sardum mare, sarepta, sarraceni nabatehi, satyri, saxones, scaldus, scena fl., scinize, scythiopolis, scorpiones, scupis, sebastia in egypto, sebastia pentapolis, seyr m., seleucia in mesopotamia, senogallia, senonis, septentrion o., sequana fl., sequani, sessia, sestos c., sichem, siculum, sidon i., sigau, siler fl., silvanectum, sinnada, sipontus, siracusa, siraph, sitifis c., sochoth, soloe, somena, spoletum, stoecades, strasburg, subentani, suessionum, sidon c., syrmium, sirtes minores, tabraca, tagapi, tagus fl., tapson i., tarentus, tarvenna, tatus c., tauri, tarominitani, tea, templum ammonis, tenedos i., theode, tabor m., tafnis c., thebe in egypto, thessalonica, teutonica, toglit, tolosa, tornacus, tragata, tragelafi, trecas, treodenus, treveris c., tripolitana r., triton fl., tuburbitani, tudertina, tullo, tungris, turchi, turonis, turris in sardinia,

tuscia, tussa, tyatira c., tiberis fl., tybut, tycinum, tigris r., tylos, tyrenum mare, ulbienses, ulca, umbria r., unicornes, ursi, valencia, valeria, varunna, velabri g., vensura, veredunus, verona, vesulus m., vicenus, vienna, vincentia, vulcano i., wandali g., warmatia, waconia, icaria i., idri marini, himantipodes, inachus fl., ipodes, hipotami, isara fl., isauria, zimus, zmirna, and austerafricus v.

Elements Unique to Munich Isidore Map

Total number of elements that are **unique to Munich Isidore Map:** 29 (12.78% of Munich Isidore Map; put differently, 87.22% of Munich Isidore Map is overlapping)

Items that are **unique to Munich Isidore Map:**

austroafricus v., favonius v., scyticus o., britannia maior, tile, gog et magog, euxinum mare, asiaticus s., corinthius s., adriaticum mare, creticum mare, hydaspis fl., caligardamana m., maleus m., lauditia c., catippi c., alexandria in scythia c., hiberia, hyrcania silva, ypanis fl., tiberis fl.?, nilus emergit, lupus cornutus, leo, simie, coluber mire longitudinis, ethiopie d., meroe c., and gallicus v.

Elements Unique to Psalter List Map

Total number of elements that are **unique to Psalter List Map:** 26 (19.4% of Psalter List Map; put differently, 80.6% of Psalter List Map is overlapping)

Items that are **unique to Psalter List Map:**

samaria r., meda, thesia, sagasta, hecatompolis, iconium c.?, syracuse, susa c.?, babilonia c., catania, gangara, padaum c., dardania, thessalia minor, wasconia, pictavia r., bulgaria, belgis c., ethiopia ulterior, hippo c., tingitania, londonia, cantuaria, dublina, armachus, and sancti andree c.

Elements Unique to Psalter Pictorial Map

Total number of elements that are **unique to Psalter Pictorial Map:** 43 (25.75% of Psalter Pictorial Map; put differently, 74.25% of Psalter Pictorial Map is overlapping)

Items that are **unique to Psalter Pictorial Map:**

amazones g., coromarces r., lachis, cyropolis, sarina?, cintilis fl., excelsus m., jor fl., torrens cison, stannum, are liberi, arbor solis, arbor lune, turris babilon?, puteus josep, albatia i., slavenia occidentalis, hyperborea g., hungaria, mare, bolonia, saale, phison, volga fl., cornubia, wallia, alexandria r., damietta, saltabri, daphnai, monasterium sancti petri, terra arenes et sterilis, transitus hebreorum, nubie m., murus alexandri, paradisus, amyctreae, monoculi, oculos in humeris, phanesii, euronothus v., aufricanus v., and nothus v.

5-Way Comparisons

Below is one example. A full report would include all five-way comparisons:

Descriptio HSV Map, Lambert de Saint Omer Map, Munich Isidore Map, Psalter List Map, and Psalter Pictorial Map

Figure 12. Venn diagram from veccompare showing a 5-way comparison.

- Total number of values (not counting duplicates): 1097
- Total number of elements that **overlap among Descriptio HSV Map, Lambert de Saint Omer Map, Munich Isidore Map, Psalter List Map, and Psalter Pictorial Map:** 8 (0.73% of the total number of values)
  - Items that **overlap among Descriptio HSV Map, Lambert de Saint Omer Map, Munich Isidore Map, Psalter List Map, and Psalter Pictorial Map:** *aquitania, cartago in africa, creta, hibernia, hispania, roma, scotia, and sicilia*

Elements Unique to Descriptio HSV Map

Total number of elements that are **unique to Descriptio HSV Map:** 577 (61.51% of Descriptio HSV Map; put differently, 38.49% of Descriptio HSV Map is overlapping)

Items that are **unique to Descriptio HSV Map:**

abarim m., abidos i., abricatina, actia nicopolis, adanum i., adriaticus s., africa catharginensis, africa minor, africa numidiana, aginno, aglos, agregentum, airoth, alba, albani, albanicus o., albula, alpes gothice, amana, amandros, ambianis, ancona, andegavis c., antopolis, apallina i., apamia, apollonia c., appennini m., aquileia, aquilonalis o., aquis, ara, arab, eudemon, arach, arausica, archad, ardennes, argentora, argus, arimaspi, armenia inferior, arsinoe, avernia r., avernis c., asia, asiaticum mare, aspides, athandros, atrebatum, attica, avenna m., augusta, augustudunus, aulon cilicus, aulona, aureus m., aurelianis, auseium, australis o., austria, autisiodorum, axona fl., aves, bactrus fl., baiogas c., baleares i., balearicum m., bar, basidim, basilea c., basilicus, batavia, berenice p., beneventum, bethania, bethel, bethoron, baetica, baetis fl., birete, bituris c., bituriges r., bizacena, bogdada, bonacon, bononia francia, boreus c., bosos, bracara c., bragmania r., bragmania c., bragmani g., brigantia, britannicum m., britannicus s., brucii, brixia, brixon fl., brundisium, burgundiones, cabilones, cadurx, calabria r., calaminica, chalearsus lacus, calpes m., cameleopardus, cameracus, campi c., catabathmon m., cantabria, cantabricus s., capria i., capsa colim, cariz m., caralitani, carmea, carmelus c., carmelus m., carnotum, carpatos i., carthagensis mare, caspius m., catalonia, cedar, cenneret, cenomanis, centumcellis, cerastes, ceronia, cervi, cesarea in capadocie, cesaria in mauritania, ceutria, chadesbarne, cana, chobar fl., cyclades, cidnus fl., cimera m., cinopodes, circapolis, cisame, citherea i., clarus m., claudiopolis, climax m., clipea, coaspis, cocadrillus, colubraria i., commagena, constantia, convenarum, cornelli forum, cornicularia, cosium, cristoas, cucim c., delminium c., danaper fl., delos i., delphi, delsephon, derbant, didime i., dioscorus, domin, donimus, dordonia, dorstedas, draco, durentia, durius, eborica, ebos fl., echbatanis, edua, egyptus plana, elamite, elefantes, hellada, emaus, emerita, moisselon emporium, engloisma, enon, epiphania, epiroea, epirus, equinus, eraclea in asia minor, eraclea in pannonia, eraus, eridanus, ericusa i., erimantus, ethiemens, ethiopia egyptus, ethiopia india, etruria, evilath, evonia, exargus, farat, farus, fasidis, fauni, flaminia, fontes, formica, forum julii, franci g., frigia maior, frigia minor, frisia, futensis, futh, galathe, galgala, galigardamena, galli g., gallia celtica, gallia cisalpina, gallia narbonensis, gallia transalpina, galloreci, gangarida, gangines ethiopes, gargala, garonna, gaudonia, gaza, gazari g., gehenna, gelboe m., geloni, gennabus, gethsuri,

gigantes, gog, goren, gortina, gratianopolis, grifes, guisara, gutalas, hadrumetum, hai, helles fl., helvetii, hermon m., hiberia inferior, hiberia superior, hibericum mare, hyrcani g., hispanicum mare, bicipites, carent linguis g., quatuor oculos, labro prominente g., qui nunquam igne utuntur, qui se in mare precipitant, sine capite, solis carnibus viventes, horeb m., hrohes, hus, hylerdis c., hyperboreus, hystmos, jaculus, iadera, janua, icarium mare, iconium c., ictiofagorum i., illiricum r., imolas, incubi, indicus o., iona fl., jor fons, juranus, canusius, lacedemonia c., langlaria, laodicia, lanius, lates fl., laudunus, leapitina, lebraha, lecenna, lemovica, leodium, leones, leptis, lesaria, letheus fl., leucaton, leuti p., libia africana, libia cirenensis, libia ethiopes, libia pentapolis, libicum mare, libie d., liburnia r., lidia, ligeris fl., liguria, lilibeum, lingonum, listra, lixus fl., lotharingia, lucania, luceria, luceni, luxovium, magdalus c., magnum mare, magog, magolona, malichu i., malva fl., mantua, manticora, mara, marcomanni, margus, maroch, martionopolis, massilia, matisconum, matrona, mauritania sitifensis, mauritanicum mare, meander, mediomatricum c., megara, meldis, melena, melita, melos i., membriona, menapi, menela c., menelaus m., messana, messia i., messia c., metis, metona, mevania, miletus, mineus fl., mogona, monopodes, cassinus m., mosa fl., mosella, nabath, nadaver, nametis, nani, narbonensis r., nasamones, noxon, neapolis, neamusium, nicaea, nicopolis, nivaria i., nivernis, noviomus, nubie p., nubii g., numides g., numidicus s., nursia, occea, occhus, octogora fl., olympia c., olympus m., oliveti m., onagri, organus, ortigia, oruns, oximus, pachinum, pactolus fl., padus fl., pamphilium mare, pamplona, pandea g., panisus, panorma, pantaris c., panther, papia, par, paranda, parchoatras m., parma, parthan in armenia c., parthia in parthia c., patras, pelorum m., pelusium fl., bergomum, pergamus, perusium, pestum, petra, phatures, phenicis mare, piscinus, pictavis c., pigmei, pisa, piscaria fl., pitavium, placentia, poros, prochenissa i., prusias c., psilli, ptolomais, punici, ramesses, reate, redonis, regium, retia maior, retia minor, robasci, rupis, ruthupi portus c., ruthenus c., sabrata, sagagdan, sagiensis, sagitarii, sagomna, sala c., sala fl., salamina, saldis c., sale c., salerna, saline, salmon, saltus, samo fl., sancti jacobi c., santonum, sannium, sardinicum mare, sardis, sardum mare, sarepta, sarraceni nabatehi, satyri, saxones, scaldus, scena fl., scinize, scythiopolis, scorpiones, scupis, sebastia in egypto, sebastia pentapolis, seyr m., seleucia in mesopotamia, senogallia, senonis, sequana fl., sequani, sessia, sestos c., sichem, siculum, sidon i., sigau, siler fl., silvanectum, sinnada, sipontus, siracusa, siraph, sitifis c., sochoth, soloe, somena, spoletum, stoecades, strasburg, subentani, suessionum, sidon c., syrmium, sirtes minores, tabraca, tagapi, tagus fl., tapson i., tarentus, tarvenna, tatus c., tauri, tarominitani, tea, templum ammonis, theode, tabor m., tafnis c., thebe in egypto, thessalonica, toglit, tolosa, tornacus, tragata, tragelafi, trecas, treodenus, treveris c., tripolitana r., triton fl., tuburbitani, tudertina, tullo, tungris, turchi, turonis, turris in sardinia, tussa, tyatira c., tiberis fl., tybut, tycinum, tigris r., tylos, ulbienses, ulca, unicornes, ursi, valencia, valeria, varunna, velabri g., vensura, veredunus, verona, vesulus m., vicenus, vienna, vincentia, vulcano i., wandali g., warmatia, waconia, icaria i., idri marini, himantipodes, inachus fl., ipodes, hipotami, isara fl., isauria, zimus, zmirna, and austerafricus v.

Elements Unique to Lambert de Saint Omer Map

Total number of elements that are **unique to Lambert de Saint Omer Map:** 52 (28.57% of Lambert de Saint Omer Map; put differently, 71.43% of Lambert de Saint Omer Map is overlapping)

Items that are **unique to Lambert de Saint Omer Map:**

hesperia r., lusitania, terracona c., flandria, sabinia, lavinia, jovis m., magnesia, maronea, hunorum g., lazorum g., hippodes, margiana, octogora i., lama, paflam g., pamphilia r., pontica, scanzia, sclavi g., philistea, saba ethiopia, moab og. basan, thalassa, carsinia, ophir, sirtes maiores, meotides mare, hiberus i., india ultima, phenix, ethiopum terra, ethiope d., septem m.,

ponticum mare, brachium georgicum, macedonicum mare, thatanna, mavania, mona, colchos c., solis i., nibaria, brionia, beata, poncia, naxos, antipodes, plaga australis, zona australis frigida, zona fervida inhabilitabilis, and occeanus filiis adae incognitus

Elements Unique to Munich Isidore Map

Total number of elements that are **unique to Munich Isidore Map:** 27 (11.89% of Munich Isidore Map; put differently, 88.11% of Munich Isidore Map is overlapping)

Items that are **unique to Munich Isidore Map:**

austroafricus v., favonius v., britannia maior, tile, gog et magog, euxinum mare, asiaticus s., corinthius s., creticum mare, hydaspis fl., caligardamana m., maleus m., lauditia c., catippi c., alexandria in scythia c., hiberia, hyrcania silva, ypanis fl., tiberis fl.?, nilus emergit, lupus cornutus, leo, simie, coluber mire longitudinis, ethiopie d., meroe c., and gallicus v.

Elements Unique to Psalter List Map

Total number of elements that are **unique to Psalter List Map:** 24 (17.91% of Psalter List Map; put differently, 82.09% of Psalter List Map is overlapping)

Items that are **unique to Psalter List Map:**

samaria r., meda, thesia, sagasta, hecatompolis, iconium c.?, syracuse, susa c.?, babilonia c., catania, gangara, padaum c., thessalia minor, pictavia r., bulgaria, belgis c., ethiopia ulterior, hippo c., tingitania, londonia, cantuaria, dublina, armachus, and sancti andree c.

Elements Unique to Psalter Pictorial Map

Total number of elements that are **unique to Psalter Pictorial Map:** 41 (24.55% of Psalter Pictorial Map; put differently, 75.45% of Psalter Pictorial Map is overlapping)

Items that are **unique to Psalter Pictorial Map:**

amazones g., coromarces r., lachis, cyropolis, sarina?, cintilis fl., excelsus m., jor fl., torrens cison, stannum, are liberi, arbor solis, arbor lune, turris babilon?, puteus josep, slavenia occidentalis, hyperborea g., hungaria, mare, bolonia, saale, phison, volga fl., cornubia, wallia, alexandria r., damietta, saltabri, daphnai, monasterium sancti petri, terra arenes et sterilis, transitus hebreorum, nubie m., murus alexandri, amyctreae, monoculi, oculos in humeris, phanesii, euronothus v., aufricanus v., and nothus v

Reference

Virtual Mappa Project. 2018. "Higden Royal 14C IX Map: British Library, Royal 14.C IX, fols. 1v-2r." Accessed July 23, 2019. https://sims2.digitalmappa.org/36.