

Cluster Processing User Guide

Sections

1. Processing GPS Data
2. Filter, Clean and Rarify Data

Collar Cleaning
User Guide

3. Cluster Generation

Warren Wolf Algorithm
User Guide

4. Merging
5. Matching

Cluster Processing
User Guide

Programs:

mergelocW_v7.R

merges location files

mergeMC2_v3.R

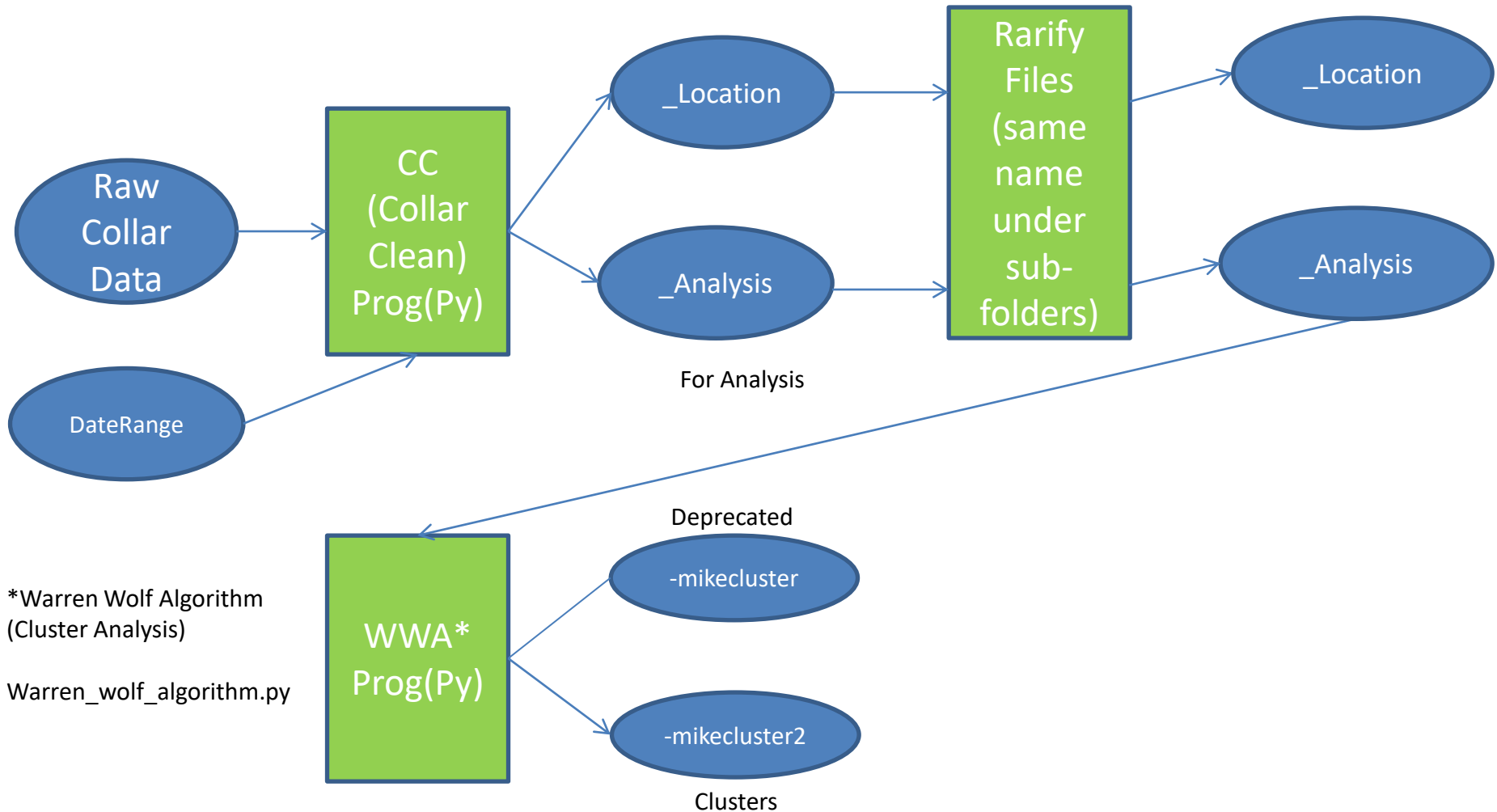
merges mikecluster2 files

4. MERGING

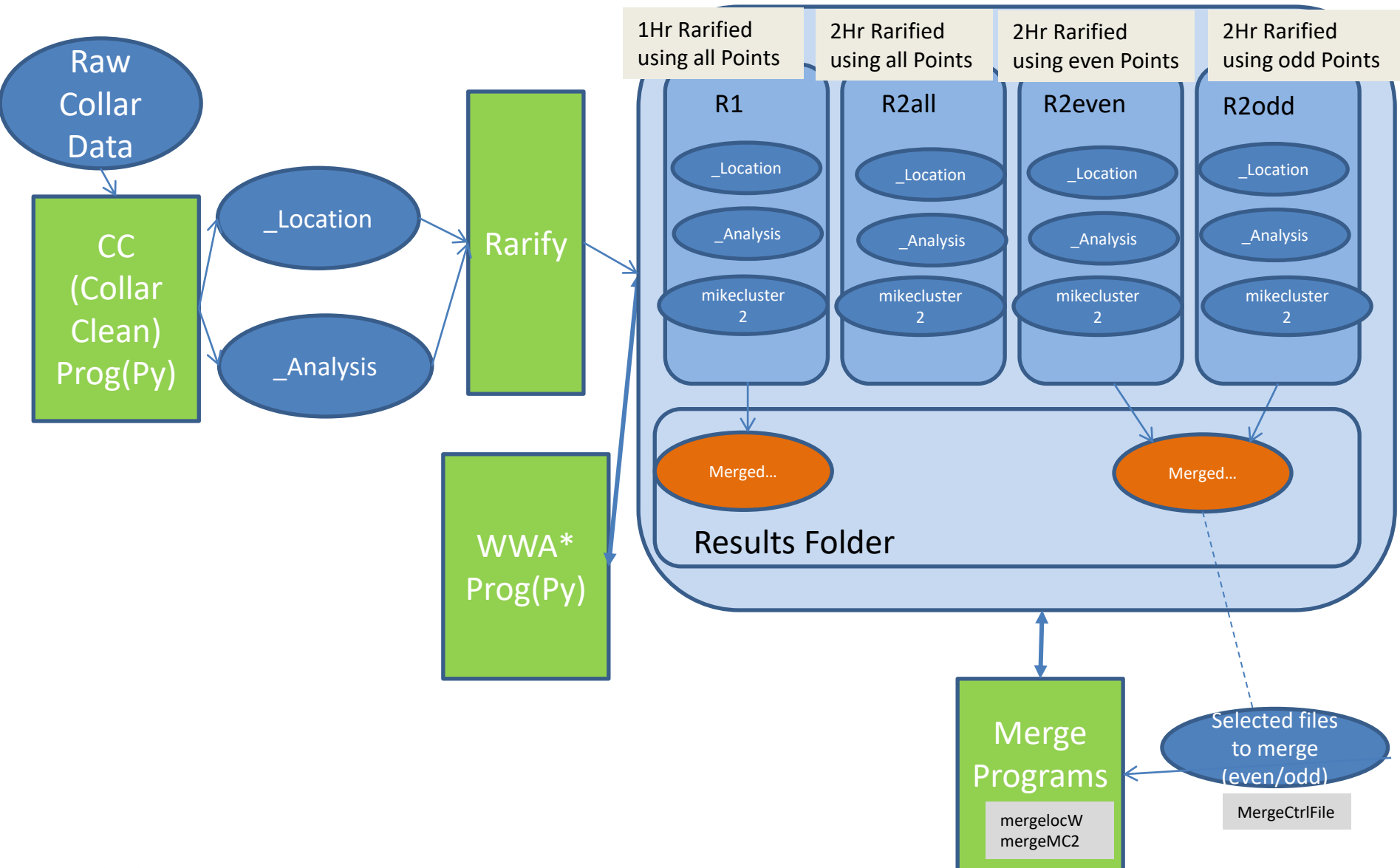
Merging

- Overview of directory structure
- Key programs written in R
- Tags added to each line to enable bi-directional tracing:
 - Rfolder: which folder rows taken from
 - Findex: F[ile] Index - multiple files for the same WolfID are numbered 1,2...

Rarify Flow



Directory Structure



Sample: bbbMergeCtrlFile

	A	B	C	D
1	WolfID	MergeCtrl1	MergeCtrl2	Notes
2	W01	R1	R2odd	
3	W02	R1	R2odd	
4	W03	R1	R2even	
5	W04	R1	R2odd	
6	W05	R1	R2even	
7	W06	R1	R2even	
8	W07	R1	R2even	
9	W08	R1	R2odd	
10	W09	R1	R2odd	
11	W10	R1	R2even	
12	W11	R1	R2odd	email had
13	W12	R1	R2odd	
14	W13	R1	R2odd	
15	W14	R1	R2even	
16	W15	R1	R2odd	
17	W16	R1	R2even	
18	W19	R1	R2odd	
19	W20	R1	R2even	
20	W21	R1	R2odd	
21	W22	R1	R2even	
22	W23	R1	R2odd	email did r
23	W24	R1	R2even	
24	W25	R1	R2odd	
25	W26	R1	R2odd	
26	W27	R1	R2odd	
27				

This files directs two merges

Running programs

- Mandatory: run Cluster merge first
- mergeMC2_v3.R merges mikecluster2 files
- Next: Then run Location merge
- mergelocW_v7.R merges location files
- Review and save log

Results Folder: Merge Output

Source folder

Blending Tag for Wolf# [1..30]

1 = folder R1
o = folder R2odd
e = folder R2even
x = skipped Wolf#

mergedWmc2 = merged mikecluster2

mergediloc = merged location files - Intermediate

mergedWloc = merged location files - Final

Merged Location File: Sample

X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
Rfolder	FnameLoc	FnameClu	Findex	stepdur	CluCentID	CluFirstPt	CluLastPt	CluInnerPt	CluAwayPt	CluFirstRowID	CluLastRowID	CluInnerRowID	CluAwayRowID	
R1	Televilt_W05_GL_20160120201804	NA	1	2	NA	0	0	0	1	NA	NA	NA	732	
R1	Televilt_W05_GL_20160120201804	NA	1	2	NA	0	0	0	1	NA	NA	NA	732	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	0	NA	NA	732	NA	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160329_020000	1	0	0	1	733	NA	NA	732	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160329_020000	0	0	1	1	NA	NA	733	732	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160329_020000	0	0	1	1	NA	NA	733	732	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	1	NA	NA	732	733	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	1	NA	NA	732	733	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160329_020000	0	0	1	1	NA	NA	733	732	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160329_020000	0	1	0	1	NA	733	NA	732	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	0	NA	NA	732	NA	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	0	NA	NA	732	NA	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	0	NA	NA	732	NA	
R1	Televilt_W05_GL_20160120201804	Televilt_W05_GL_20160120201804	1	2	GL_W05_20160328_120000	0	0	1	0	NA	NA	732	NA	

Rfolder: which rarification folder
FnameLoc: source Location file
FnameClu: source Cluster file
Findex: which file if multiple files for a single Wolf
CluCentID: cross reference to CentID from merged Cluster file
CluFirstPt: 1 if first point in Cluster
CluLastPt: 1 if last point in Cluster
CluInnerPt: 1 if inner point in Cluster
CluAwayPt : >1 if first point in Cluster
CluFirstRowID: rowID of first pt in merged Cluster file
CluLastRowID: rowID of last pt in merged Cluster file
CluInnerRowID: rowID of inner pt in merged Cluster file
CluAwayRowID: rowID of away pt in merged Cluster file (only the last one found is recorded)

Main Programs:

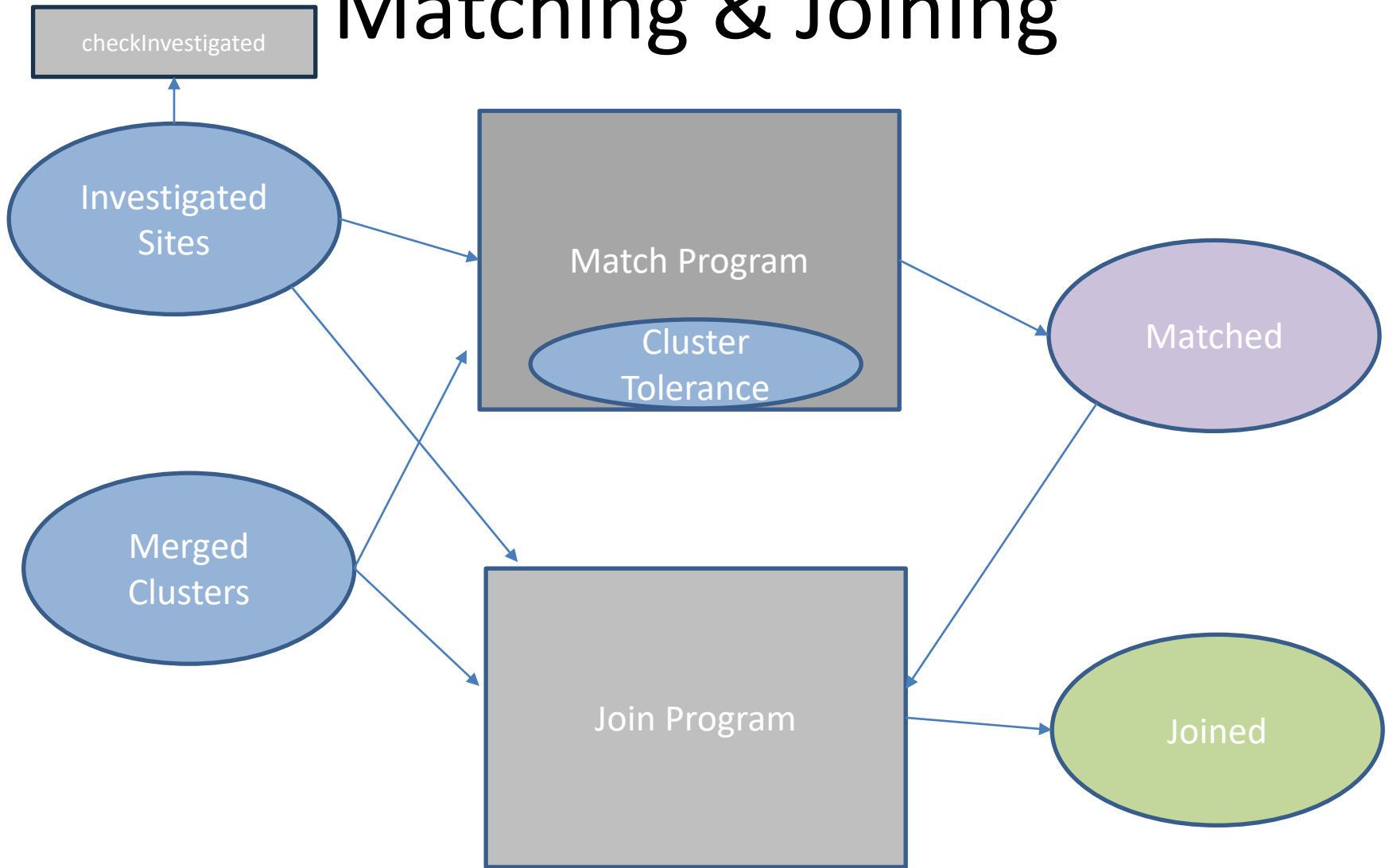
matchWsites_v8	match: generated clusters (WWA) and investigated sites
joinWsites_v2.R	join: generated clusters and investigated sites
cluMatch_v30.R	match: clusters across multiple wolves (MW)

Check Programs:

checkInvestigated_v1.R	check raw investigated site file for consistency
checkMWdata_v7.R	check for consistent multi-wolf clusters

5. MATCHING

Matching & Joining



Matching

- The match program takes several inputs
 - Edit the program before running
- #
- # Cluster Tolerance (tolerance in meters added to buffer)
- cluster_tolerance = 5
- cluster_tolerance = 0
- #
- # Investigation File
- investFile = "InvestigatedPoints0131_cleaned20180614.csv"
- #
- # Merged MikeCluster2 File"
- groupFile = "mergedMC2-locdataAll-CCv31-BLEND_1111111x11111111xx1111x1111xxx.csv"
- #
- # Results Directory
- resultsDir = "locdataAll-CCv31/Results"

Match File

- Run the program (matchWsites_v8.R)
- Check the results folder, should see a file along the lines of:

– Matched-CTM25-mergedMC2-locdataAll-CCv31-BLEND_ooeoeexoeooooeoxxoexeooxxx.csv



Indicates Matched, Tolerance Used, Name of merged file

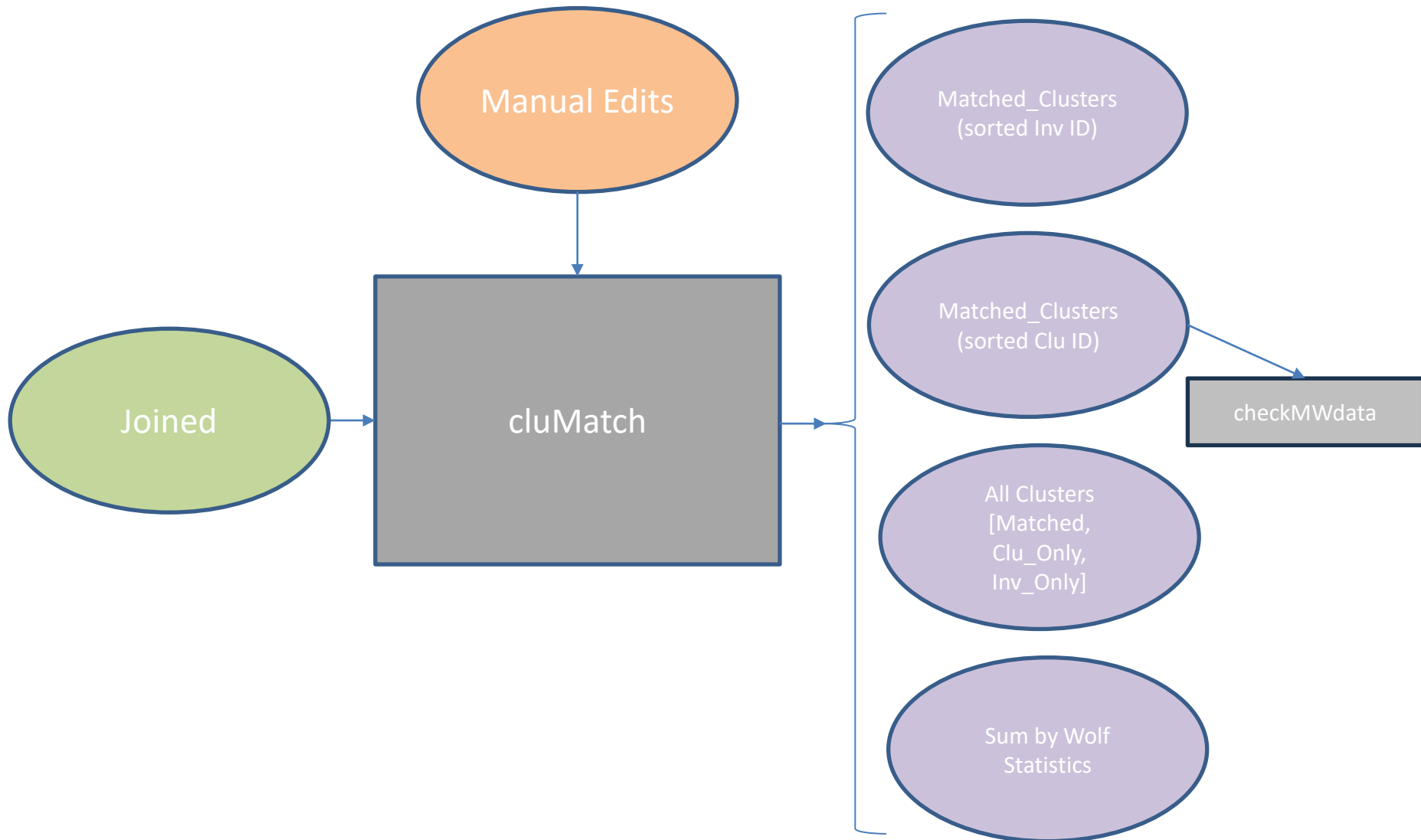
Joining

- The join program takes several inputs
 - Edit the program before running
- ##### Change the following names as required #####
- #
- # Results directory to use
- # Investigation file to use
- # Merged Cluster file to use
- # Cluster Tolerance to use to create name for Matched file
- #
- # Results Directory
- resultsDir = "locdataAll-CCv31/Results"
- #
- # Investigation File
- investFile = "InvestigatedPoints0131_cleaned20180614.csv"
- #
- # Merged MikeCluster2 File
- groupFile = "mergedMC2-locdataAll-CCv31-BLEND_ooeoeexoeooooeoxoeoexeooooxxx.csv"
- #
- # Cluster Tolerance (tolerance in meters added to buffer)
- #
- cluster_tolerance = 0
- #cluster_tolerance = 25

Join File

- Run the program (joinWsites_v2.R)
 - Check the results folder, should see a file along the lines of:
 - Join-Matched-CTM25-mergedMC2-locdataAll-CCv31-BLEND_ooeoeexoeooooeoxoeoexeooooxxx.csv
- Indicates the Join of the Matched file with the Merged Cluster and Investigated Sites

Multi-Wolf Cluster Matching



Backup

(for Reference Only)

Step Duration Checks

- Each species has a set of valid Step Durations which are checked with the `round(step_duration)` function.
- Wolf – Valid Step Durations (hours) = (1, 2)
 - $0.5 < \text{step_duration} \leq 2.5$
- Deer – Valid Step Durations (hours) = (0.3, 2, 4)
 - $0.25 < \text{step_duration} < 0.35 \rightarrow$ rarified to 1 hour
 - $1.50 < \text{step_duration} \leq 2.50$
 - $3.50 < \text{step_duration} \leq 4.50$
- Moose – Valid Step Durations (hours) = (2)
 - $1.5 < \text{step_duration} \leq 2.5$
- Elk – Valid Step Durations (hours) = (2)
 - $1.5 < \text{step_duration} \leq 2.5$

Sample Directory Structure I

Computer > Local Disk (C:) > Wolf-Projects > Data > locdataAll-CCv31 - R300H96 - Final >				
Include in library ▾ Share with ▾ Burn New folder				
Name	Date modified	Type	Size	
Edit-info	2020-11-22 11:57 ...	File folder		<ul style="list-style-type: none"> Original files After cc_v31
Original	2020-11-22 11:57 ...	File folder		
R1	2020-11-22 11:57 ...	File folder		<ul style="list-style-type: none"> Rarified Files R1 R2all, R2even and r2odd
R2all	2020-11-22 11:57 ...	File folder		
R2even	2020-11-22 11:57 ...	File folder		
R2odd	2020-11-22 11:57 ...	File folder		
Results	2021-02-16 6:45 PM	File folder		<ul style="list-style-type: none"> All Results
zLogs	2020-11-22 11:57 ...	File folder		
zzArchive	2021-02-16 6:32 PM	File folder		
aaaControlFile.csv	2019-05-13 1:34 AM	Microsoft Excel C...	1 KB	<ul style="list-style-type: none"> Control file for rarification
aaaRarityLog.csv	2019-05-22 8:37 AM	Microsoft Excel C...	21 KB	
aaaRarityLogSums.xlsx	2019-05-23 1:06 AM	Microsoft Excel W...	34 KB	
bbbMergeCtrlFile.csv	2019-05-18 12:35 ...	Microsoft Excel C...	1 KB	

Sample Directory Structure II

Computer > Local Disk (C:) > Wolf-Projects > Data > locdataAll-CCv31 - R300H96 - Final > Results			
Open Print Burn New folder			
Name	Date modified	Type	Size
2021-01-03-CM_SZcM_CluSiteList.csv	2021-02-13 8:16 PM	Microsoft Exc...	526 KB
2021-01-03-CM_SZcM_SumBy_Wolf.csv	2021-02-13 8:16 PM	Microsoft Exc...	20 KB
Manual_Remove_2021-01-30.csv	2021-01-30 11:57 PM	Microsoft Exc...	1 KB
steps-used-mergedBloc-locdataAll-CCv31 - R300H96 - Final-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2021-01-02 3:16 PM	Microsoft Exc...	7,150 KB
steps-used-mergedKloc-locdataAll-CCv31 - R300H96 - Final-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2021-01-02 3:16 PM	Microsoft Exc...	3,309 KB
steps-used-mergedTloc-locdataAll-CCv31 - R300H96 - Final-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2021-01-02 3:16 PM	Microsoft Exc...	10,485 KB
mergedBloc-locdataAll-CCv31 - R300H96 - Final-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2021-01-02 5:52 AM	Microsoft Exc...	19,797 KB
mergedKloc-locdataAll-CCv31 - R300H96 - Final-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2021-01-02 5:52 AM	Microsoft Exc...	9,351 KB
mergedTloc-locdataAll-CCv31 - R300H96 - Final-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2021-01-02 5:51 AM	Microsoft Exc...	28,760 KB
ClusterMatch_SZcleaningMod.csv	2020-08-10 7:48 PM	Microsoft Exc...	3,268 KB
ClusterMatch_SZcleaning.csv	2020-05-04 9:51 AM	Microsoft Exc...	3,268 KB
ClusterMatch_SZcleaningOrig.csv	2020-05-04 9:51 AM	Microsoft Exc...	3,268 KB
Join-Matched-CTM25-mergedWmc2-locdataAll-CCv31 - R300H96 - Test-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2019-09-14 10:20 PM	Microsoft Exc...	4,636 KB
mergedWloc-locdataAll-CCv31 - R300H96 - Test-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2019-09-14 9:29 PM	Microsoft Exc...	17,798 KB
mergedilloc-locdataAll-CCv31 - R300H96 - Test-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2019-09-14 9:27 PM	Microsoft Exc...	14,184 KB
mergedWmc2-locdataAll-CCv31 - R300H96 - Test-BLEND_00e0eeexoe000e0exxoe0ex000xxx.csv	2019-09-14 4:17 PM	Microsoft Exc...	2,418 KB
InvestigatedPoints0131_cleaned20180614.csv	2019-02-24 9:42 PM	Microsoft Exc...	186 KB
zArchive	2021-02-16 6:42 PM	File folder	
zFileSent	2021-02-05 11:44 PM	File folder	
kwtm	2020-11-22 11:57 PM	File folder	
kwtm_using_Kfile	2020-11-22 11:57 PM	File folder	

- Common Clusters

- Step files
- Between kills, Kill, Total

- Location files (ttk, etc.)
- K = Kill Locations

- ClusterMatch_
SZcleaningMod is used

- Original Join-Match and
blended location and
cluster files