QAQC Updates

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LANDIS-II Upgrades Project

I. OpenIssues

```
Title: OpenIssues GitHub
Project Descriptor: LANDIS_Upgrades_Project
Project ID: 2016SoE021
Author: bmarron
Origin Date: 15 Feb 2017
Final Date:


###################
email updates
###################




#####################################################################
OpenIssues in GitHub
#####################################################################

* w/o initial flag to bmarron18


---- LANDVIZ ------------------------------------------------------------------------------




---- CoreModel ----------------------------------------------------------------------------

[LANDIS-II-Foundation/Core-Model] Spp name added to error messages; version number added to (#17)


[bmarron18/Core-Model] Updated deploy instructions and change Cleanup() and InitilizePhase2() to virtual members (#7)
[bmarron18/Extension-Land-Use-Change] Changed CleanUp() to be a virtual member (#1)
[bmarron18/Extension-LinearWind] Changed IntializePhase2() to be a virtual member (#1)
[bmarron18/Extension-Base-BDA] Changed IntializePhase2() to be a virtual member (#1)



------ disturbance extensions ---------------------------------------------------------------
[LANDIS-II-Foundation/Extension-Base-Fire] Needs metadata output (#1)


[LANDIS-II-Foundation/Extension-Biomass-Harvest] Biomass Harvest not communicating with succession for partial cohort distu
[LANDIS-II-Foundation/Extension-Biomass-Harvest] Need to add StandRanking by average aboveground biomass (back) (#14)


[LANDIS-II-Foundation/Extension-Biomass-Insect] Needs metadata output (#1)
```

```
----- succession extensions ------------------------------------------------------------
[LANDIS-II-Foundation/Extension-Age-Only-Succession] Needs metadata library (#1)



[LANDIS-II-Foundation/Extension-Biomass-Succession] Example files not working (#2)
[LANDIS-II-Foundation/Extension-Biomass-Succession] Log file does not match output from Biomass Output (#3)
[LANDIS-II-Foundation/Extension-Biomass-Succession] Needs metadata (#7)
[LANDIS-II-Foundation/Extension-Biomass-Succession] Needs CohortPartialMortality to use the new Library.BiomassCohorts-v2 (
[LANDIS-II-Foundation/Extension-Biomass-Succession] Documentation needs updating (#10)




----- output extensions ----------------------------------------------------------------
[LANDIS-II-Foundation/Extension-Output-Biomass] Needs metadata (#1)


[LANDIS-II-Foundation/Extension-Output-Biomass-By-Age] Needs metadata output (#1)


[LANDIS-II-Foundation/Extension-Output-Biomass-Reclass] Needs metadata (#1)


[LANDIS-II-Foundation/Extension-Output-Maximum-Spp-Age] Needs metadata output (#2)
[LANDIS-II-Foundation/Extension-Output-Maximum-Spp-Age] Needs to be migrated over from extensions-output\ sub-directory (#1


[LANDIS-II-Foundation/Extension-Output-Age-Reclassification] Needs metadata output (#2)
[LANDIS-II-Foundation/Extension-Output-Age-Reclassification] Needs to be migrated over from extensions extensions-output (#


[LANDIS-II-Foundation/Extension-Output-Cohort-Statistics] Needs metadata output (#2)
[LANDIS-II-Foundation/Extension-Output-Cohort-Statistics] Needs to be migrated from extensions-output sub-directory (#1)



---- libraries -------------------------------------------------------------------------




################################################################################
Issues ready for QAQC testing OR documentation OR repo standardization
################################################################################

https://github.com/LANDIS-II-Foundation/Extension-Land-Use-Change/issues/3
Due to an update to core-mode, CleanUp() now requires developers to use the override keyword instead of new

https://github.com/LANDIS-II-Foundation/Extension-Base-BDA/issues/1
This is due to an update of making InitilizePhase2() a virtual member in core-model

https://github.com/LANDIS-II-Foundation/Extension-LinearWind/issues/1
This is due to InitializPhase2() being changed to a virtual member in core-model
```

[LANDIS-II-Foundation/LANDVIZ] Developer documentation needs updating for new release (#21)
Comment:Detailed information for developers about the LANDVIZ changes and the protocol needed to rebuild LANDVIZ is currently provided in, "README_Rebuild_PreProcTool.txt". JLiem's work log is also included in the repo. Should this info be formally integrated into the Developer Guide.pdf?

https://github.com/LANDIS-II-Foundation/Extension-Biomass-Succession/issues/9
https://github.com/LANDIS-II-Foundation/Extension-Biomass-Succession/pull/8
ICohorts EXCPTN thrown issue;
partial harvesting changing the amount of dead woody material issue;
restructure and fix to work with Biomass Cohorts issue

https://github.com/LANDIS-II-Foundation/Extension-Biomass-Succession/issues/10
Biomass succession docs updates
The documentation does not include a) climate library information, b) metadata information.
Both can be copied from NECN docs.

[LANDIS-II-Foundation/Extension-Age-Only-Succession] Restructure (#2)
Restructured the repository to make use of the new one-click build setup

[LANDIS-II-Foundation/Extension-Output-Biomass] Needs metadata (#1)
Pull request submitted and ready for review/testing

[LANDIS-II-Foundation/Extension-Output-Biomass] Restructure and Metadata (#2)
Restructured the repository and also changed it to use metadata

https://github.com/LANDIS-II-Foundation/Extension-Biomass-Succession/pull/8
restructure and fix to work with Biomass Cohorts issue

##
QAQC testing in-progress; Not yet closed
##

https://github.com/LANDIS-II-Foundation/Extension-Biomass-Harvest/issues/13
dead biomass issue; partial harvesting changing the amount of dead woody material issue

https://github.com/LANDIS-II-Foundation/Extension-Base-Harvest/issues/1
https://github.com/LANDIS-II-Foundation/Library-Harvest-Mgmt/pull/6

https://github.com/LANDIS-II-Foundation/Library-Harvest-Mgmt/pull/7
salvage logging issue

##
QAQC complete AND closed issues OR closed issues w/o QAQC
##

* not QAQC tested

* https://github.com/LANDIS-II-Foundation/Core-Model/issues/11
Input files should be parsed out

* https://github.com/LANDIS-II-Foundation/Extension-Biomass-Harvest/issues/10
adjacency/type input error issue

* https://github.com/LANDIS-II-Foundation/Extension-Biomass-Succession/pull/6
activate climate library issue

* https://github.com/LANDIS-II-Foundation/Library-Biomass-Harvest/pull/1/
allow for total thinning (between 0-99%) issue

* https://github.com/LANDIS-II-Foundation/Extension-PnET-Succession/pull/2
activate climate library issue

[LANDIS-II-Foundation/Extension-Age-Only-Succession] Needs metadata library (#1)
Indeed, no need for metadata. Issue closed.

https://github.com/LANDIS-II-Foundation/LANDVIZ/issues/18
LANDVIZ integer error issue. Closed

https://github.com/LANDIS-II-Foundation/LANDVIZ/issues/19
PyInstaller re-build issue. Closed

########################

```
Git Large File Storage
######################

large file storage (LFS) in GitHub:
==> https://help.github.com/articles/working-with-large-files/
==> https://help.github.com/articles/versioning-large-files/
==> https://git-lfs.github.com/
==> https://help.github.com/enterprise/2.8/admin/articles/configuring-git-large-file-storage-for-a-repository/
```

```
bmarr@DESKTOP-1KEFDDQ MINGW64 ~/Desktop/New_folderGitHub/LANDVIZ (master)
$ git push origin master
Counting objects: 1247, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (1235/1235), done.
Writing objects: 100% (1247/1247), 513.78 MiB | 101.00 KiB/s, done.
Total 1247 (delta 297), reused 24 (delta 2)
remote: warning: File PreProcTool/deploy/Pyinstaller-plus-PythonDependencies/32bit/scipy-0.18.1-cp27-cp27m-win32.whl is 52.

remote: error: GH001: Large files detected. You may want to try Git Large File Storage - https://git-lfs.github.com.

remote: error: Trace: 4c92f477edfe6787e78c6f3b081510f6

remote: error: See http://git.io/iEPt8g for more information.

remote: error: File PreProcTool/deploy/installers/current_msi_installer/LandisPreProcToolInstaller-cache/part1/disk1.cab is

remote: error: File PreProcTool/deploy/installers/current_msi_installer/LandisPreProcToolInstaller.msi is 132.41 MB; this e


To https://github.com/bmarron18/LANDVIZ.git
 ! [remote rejected] master -> master (pre-receive hook declined)
```

II. Salvage Logging

```
Title: QAQC of salvage logging w/ NECN and BiomassHarvest
Project Description: LANDIS-II upgrades/corrections
Project ID: 2016SoE021
```

```
Author: bmarron
Origin Date: 26 Feb 2017
Final Date: 26 Feb 2017



#############
QAQC Summary
#############

1. Five, (5) QAQC runs were made:
==> two, (2) runs with
*StandRanking MaxCohortAge
==> one, (1) run with
*StandRanking TimeSinceDisturbance
*TimeSinceLastFire 90
*Mngmnt Area 1
==> one, (1) run with
*StandRanking TimeSinceDisturbance
*TimeSinceLastFire 1
*Mngmnt Area 1
==> one, (1) run with
*StandRanking TimeSinceDisturbance
*TimeSinceLastFire 75
*Mngmnt Area 1
*StandRanking TimeSinceDisturbance
*TimeSinceLastFire 5
*Mngmnt Area 1
*StandRanking TimeSinceDisturbance
*TimeSinceLastFire 75
*Mngmnt Area 3
*StandRanking TimeSinceDisturbance
*TimeSinceLastFire 5
*Mngmnt Area 3

2. All QAQC runs used
*SiteSelection Complete
*CohortsRemoved ClearCut



#############
QAQC Results
#############

1. Extension-Biomass-Harvest (running NECN succession and Base Fire) DOES recognize
    the new StandRanking prescription, "TimeSinceDisturbance" set with the
    "TimeSinceLastFire" parameter. No LANDIS-II runtime errors were encountered.



2. The new StandRanking prescription, "TimeSinceDisturbance" set with the
   "TimeSinceLastFire" parameter outputs NO HARVEST DATA with Extension-Biomass-Harvest
    (running NECN succession and Base Fire). The parameter, "TimeSinceLastFire" was run
    with
*TimeSinceLastFire 90
*TimeSinceLastFire 1
*TimeSinceLastFire 75
*TimeSinceLastFire 5

   NO HARVEST DATA was obtained with any of these parameter settings. Presence or absence
```

```
   of post-run data output was performed by checking the contents of
*"harvest/harvest_summary_log.csv"
*"NECN_succession_log.csv"
*"harvest/harvest-biomass-removed-{timestep}.img" maps
*"harvest/harvest-prescripts-{timestep}.img" maps



3. To verify that LANDIS-II was correctly processing runs using Extension-Biomass-Harvest
   (running NECN succession and Base Fire), the first two, (2) QAQC runs were realized
    with
*StandRanking MaxCohortAge
    Harvest data was obtained in both cases.



#######################
salvage logging issue
#######################
https://github.com/LANDIS-II-Foundation/Extension-Base-Harvest/issues/1
https://github.com/LANDIS-II-Foundation/Library-Harvest-Mgmt/pull/6
https://github.com/LANDIS-II-Foundation/Library-Harvest-Mgmt/pull/7

a. affected
==> Landis.Library.HarvestManagement-v2.dll
==> Landis.Library.BiomassHarvest-v2.dll
==> Landis.Extension.BaseHarvest-3.0.dll
==> Landis.Extension.BiomassHarvest-3.2.dll


b. see "PWL42a_RepoStd-LibHrvstMngmnt_20170215.txt"
==> re-built "Landis.Library.HarvestManagement-v2.dll"


c. see "PWL44_RepoStd-ExtBaseHrvst_20170216.txt"
==> std repo and rebuild .dll

1. uninstall BaseHarvest extension from LANDIS (using Windows Control Panel)
2. clone BaseHarvest repo to desktop (local)
3. make changes to .csproj and .cs files
4. re-build the .dll in VS
5. make changes to .iss file
6. compile .iss file in Inno Script Studio and generate a new installer
7. re-install BaseHarvest extension



d. see "PWL45_RepoStd-ExtBiomassHrvst_20170217.txt"
==> std repo and rebuild .dll

1. uninstall BiomassHarvest extension from LANDIS (using Windows Control Panel)
2. clone BiomassHarvest repo to desktop (local)
3. make changes to .csproj and .cs files
4. re-build the .dll in VS
5. make changes to .iss file
6. compile .iss file in Inno Script Studio and generate a new installer
7. re-install BiomassHarvest extension
```

```
###################
pre-QAQC set up
###################


a. QAQC algorithm for salvage logging testing
==> use BiomassHarvest with Extension-NECN-Succession
==> manipulate combos of three, (3) Biomass Harvest Precriptions:
*MaxAgeClearcut
*SalvageLogger1
*SalvageLogger2
==> evaluate outcome data

b. modify "scenario.txt" in Extension-NECN-Succession
==> create "scenario_SalvageLog_QAQC1.txt"

c. modify "biomass-harvest_Prescriptions.txt"
==> create "biomass-harvest_SalvageLog_QAQCPrescription.txt"

d. rename and standardize "base-fire.txt"
==> "base-fire_NECN.txt"


"scenario_SalvageLog_QAQC1.txt" ==>
================================================================================================
LandisData  Scenario

Duration  30

Species   species.txt

Ecoregions      ./ecoregions-2regions.txt
EcoregionsMap   ./ecoregions.gis

CellLength  100 << meters, 100 x 100 m = 1 ha



>> ------------------------
>> SUCCESSION EXTENSIONS
>> ------------------------

>>  Succession Extension      Initialization File
>>  --------------------      -------------------
    "NetEcosystemCN Succession" NECN-succession.txt


>> --------------------------
>> DISTURBANCE EXTENSIONS
>> --------------------------

>>  Disturbance Extensions    Initialization File
>> ----------------------    -------------------
"Base Fire" base-fire_NECN.txt
"Biomass Harvest" biomass-harvest_SalvageLog_QAQCPrescription.txt


>>   DisturbancesRandomOrder  yes  << optional parameter; default = no
```

```
>> ------------------------
>> OTHER EXTENSONS
>> ----------------------

>>  Other Extensions          Initialization File
>> ----------------          ------------------
>>    "Output Cohort Stats"     cohort-stats.output.txt


 RandomNumberSeed  147  << optional parameter; uncomment for reproducibilty tests
                          << default is a RandomNumberSeed generated using the current time
================================================================================================
```

```
"biomass-harvest_SalvageLog_QAQCPrescription.txt" ==>
================================================================================================
LandisData  "Biomass Harvest"


Timestep    5

ManagementAreas  "./management.gis"
Stands      "./stand.gis"


>> ---------------------------
>> STAND SELECTION CRITERION
>> ---------------------------
>>1) IF avgtime of fire in a stand >= TimeSinceLastFire
>>   THEN stand IS NOT selected

>>2) IF avgtime of fire in a stand < TimeSinceLastFire
>>   THEN stand IS selected



>> ----------------------------------------
>> HARVEST PRESCRIPTIONS
>> ----------------------------------------

Prescription MaxAgeClearcut
    StandRanking  MaxCohortAge
    SiteSelection  Complete
    CohortsRemoved  ClearCut


Prescription SalvageLogger1
    StandRanking TimeSinceDisturbance
    TimeSinceLastFire 90
    SiteSelection     Complete
    CohortsRemoved    ClearCut


Prescription SalvageLogger2
    StandRanking TimeSinceDisturbance
    TimeSinceLastFire 1
```

```
    SiteSelection     Complete
    CohortsRemoved    ClearCut


>> ----------------------------------------
>> PRESCRIPTION IMPLEMENTATION
>> ----------------------------------------

    HarvestImplementations
>>Mgmt Area Prescription Harvest Area BeginTime EndTime
>>--------------------------------------------------
>>1 SalvageLogger1 50%
>>1 SalvageLogger2 50%
1 MaxAgeClearcut 5% 0 15
>>1 MaxAgeClearcut 10% 15 30


>> --------------
>> OUTPUTS
>> --------------

PrescriptionMaps    harvest/harvest-prescripts-{timestep}.img
BiomassMaps         harvest/harvest-biomass-removed-{timestep}.img
EventLog            harvest/harvest-biomass-event-test-log.csv
SummaryLog     harvest/harvest-summary-log.csv
================================================================================================



"base-fire_NECN.txt" ==>
================================================================================================
LandisData  "Base Fire"

Timestep  5

>> ---------------
>> FIRE REGIONS
>> ---------------

>> Fire        Map ___ Event Size ___   Ignition
>> region      Code  Mean  Min    Max    Prob.     k
>> ---------   ----------   ----   ----   --------  --------
    MN101       1  100    4     400    0.1    100
    MN102       2  200    6     600    0.1     50

InitialFireRegionsMap "./ecoregions.gis"


>> ---------------
>> FIRE TABLES
>> ---------------

  DynamicFireRegionTable  << Optional parameter
>>Year FileName  (this line always commented out)
  20 ecoregions.gis  << If table is not active, comment out this line


  FuelCurveTable
>>             Severities (in increasing order)
>> Ecoregion   S1   S2   S3   S4   S5
>> ------------------------------------
```

```
    MN101       10   20   50   70   120
    MN102        5   15   20   -1    -1


  WindCurveTable
>>             Severities (in decreasing order)
>> Ecoregion   S5   S4   S3   S2   S1
>> ----------------------------------
    MN101       -1   -1    1   10   20
    MN102        1    5   15   20   30


  FireDamageTable
>> Cohort Age       FireSeverity -
>> % of longevity   FireTolerance
>> --------------   --------------
     20%               -2
     50%               -1
     85%                0
    100%                1


>> ---------------
>> OUTPUTS
>> -------------
MapNames   fire/fire-severity-{timestep}.img
LogFile    fire/fire-event-test-log.csv
SummaryLogFile  fire/fire-summary-log.csv

================================================================================================




######################
QAQC salvage logging
######################


a. (LANDIS-II) QAQC run1
==> "NECN-succession.txt"
==> "base-fire_NECN.txt"
==> modified "biomass-harvest_SalvageLog_QAQCPrescription.txt"
    HarvestImplementations
>>Mgmt Area Prescription Harvest Area BeginTime EndTime
>>-------------------------------------------------
>>1 SalvageLogger1 50%
>>1 SalvageLogger2 50%
>>3 SalvageLogger1 50%
>>3 SalvageLogger2 50%
1 MaxAgeClearcut 5% 0 15
>>1 MaxAgeClearcut 10% 15 30



a1. QAQCrun1 "harvest/harvest_summary_log.csv" in R
open "harvest/harvest_summary_log.csv" in R ==>
> QAQCrun1_harvest_summary_log_output <- as.matrix(setNames(harvest_summary_log[, c(2,4,5,7)], NULL))

Col2==ManagementArea
```

```
Col4==HarvestedSites
Col5==TotalCohortsCompleteHarvest
Col7==TotalBiomassHarvested

     [,1] [,2] [,3]     [,4]
[1,]    1  436 2144   932.15
[2,]    1  305 1518 13796.49
[3,]    1  337 1404 28784.21
```

```
a2. QAQCrun1 "NECN_succession_log.csv" in R
open "NECN_succession_log.csv" in R ==>
> QAQCrun1_NECN_succession_log_output <- as.matrix(setNames(NECN_succession_log[, c(3,6,25,26)], NULL))

Col3==EcoregionIndex
Col6==SOMTC
Col25==C_SOM1surf
Col26==C_SOM1soil

      [,1]    [,2]  [,3]   [,4]
 [1,]    0 17164.4 785.5 3363.3
 [2,]    1 15394.7 818.0 2947.8
 [3,]    0 15697.7 239.8 3187.4
 [4,]    1 14057.3 219.2 2818.0
 [5,]    0 14739.6 205.5 3019.9
 [6,]    1 13192.3 175.3 2685.8
 [7,]    0 13733.4 151.1 2836.4
 [8,]    1 12467.1 176.9 2552.6
 [9,]    0 12645.8 125.8 2606.8
[10,]    1 11583.8 131.9 2382.0
[11,]    0 11633.8 109.0 2387.1
[12,]    1 10644.4  95.2 2190.8
[13,]    0 10694.0  94.2 2179.5
[14,]    1  9686.3  64.0 1989.0
```

```
a3. QAQCrun1 "fire/summary-log.csv" in R
open "fire/summary-log.csv" in R ==>
> QAQCrun1_fire_summary_log_output <- as.matrix(setNames(summary_log[ ,1:5], NULL))

Col==Time
Col2==TotalSitesBurned
Col3==TotalNumberEvents
Col4==MN101
Col5==MN102

     [,1] [,2] [,3] [,4] [,5]
[1,]    5 9104  318 1635 7469
[2,]   10  769  515   77  692
[3,]   15 1496  779  147 1349
[4,]   20 2212  884  139 2073
[5,]   25 2092  853  133 1959
[6,]   30 1765  868  135 1630
```

```
b. (LANDIS-II) QAQC run2
```

```
==> "NECN-succession.txt"
==> "base-fire_NECN.txt"
==> modified "biomass-harvest_SalvageLog_QAQCPrescription.txt"
    HarvestImplementations
>>Mgmt Area Prescription Harvest Area BeginTime EndTime
>>-------------------------------------------------
>>1 SalvageLogger1 50%
>>1 SalvageLogger2 50%
>>3 SalvageLogger1 50%
>>3 SalvageLogger2 50%
1 MaxAgeClearcut 5% 0 15
1 MaxAgeClearcut 10% 15 30



b1. QAQCrun2 "harvest/harvest_summary_log.csv" in R
open "harvest/harvest_summary_log.csv" in R ==>
> QAQCrun2_harvest_summary_log_output <- as.matrix(setNames(harvest_summary_log[, c(2,4,5,7)], NULL))

Col2==ManagementArea
Col4==HarvestedSites
Col5==TotalCohortsCompleteHarvest
Col7==TotalBiomassHarvested

      [,1] [,2] [,3]     [,4]
[1,]    1  436 2144   932.15
[2,]    1  305 1518 13796.49
[3,]    1  933 3441 72965.38
[4,]    1  632 1350 39601.56
[5,]    1  622 1137 43281.59
[6,]    1   22   25   872.76


b2. QAQCrun2 "NECN_succession_log.csv" in R
open "NECN_succession_log.csv" in R ==>
> QAQCrun2_NECN_succession_log_output <- as.matrix(setNames(NECN_succession_log[, c(3,6,25,26)], NULL))

Col3==EcoregionIndex
Col6==SOMTC
Col25==C_SOM1surf
Col26==C_SOM1soil

      [,1]    [,2]  [,3]   [,4]
 [1,]    0 17164.4 785.5 3363.3
 [2,]    1 15394.7 818.0 2947.8
 [3,]    0 15697.7 239.8 3187.4
 [4,]    1 14057.3 219.2 2818.0
 [5,]    0 14739.6 205.5 3019.9
 [6,]    1 13192.3 175.3 2685.8
 [7,]    0 13615.1 107.1 2831.4
 [8,]    1 12431.0 165.9 2549.8
 [9,]    0 12203.5  35.1 2550.3
[10,]    1 11467.7 111.0 2366.3
[11,]    0 10840.4   5.2 2257.4
[12,]    1 10418.6  60.3 2158.2
[13,]    0  9624.7   0.4 1983.0
[14,]    1  9373.7  35.8 1933.7


b3. QAQCrun2 "fire/summary-log.csv" in R
open "fire/summary-log.csv" in R ==>
```

```
> QAQCrun2_fire_summary_log_output <- as.matrix(setNames(summary_log[ ,1:5], NULL))

Col==Time
Col2==TotalSitesBurned
Col3==TotalNumberEvents
Col4==MN101
Col5==MN102

      [,1] [,2] [,3] [,4] [,5]
[1,]    5 9104  318 1635 7469
[2,]   10  769  515   77  692
[3,]   15 1496  779  147 1349
[4,]   20 1964  887   46 1918
[5,]   25 1705  917   34 1671
[6,]   30  936  847    0  936
```

```
c. (LANDIS-II) QAQC run3
==> "NECN-succession.txt"
==> "base-fire_NECN.txt"
==> modified "biomass-harvest_SalvageLog_QAQCPrescription.txt"
    HarvestImplementations
>>Mgmt Area Prescription Harvest Area BeginTime EndTime
>>-------------------------------------------------
1 SalvageLogger1 50%
>>1 SalvageLogger2 50%
>>3 SalvageLogger1 50%
>>3 SalvageLogger2 50%
>>1 MaxAgeClearcut 5% 0 15
>>1 MaxAgeClearcut 10% 15 30
```

```
c1. QAQCrun3 "harvest/harvest_summary_log.csv" in R
open "harvest/harvest_summary_log.csv" in R ==>
> QAQCrun3_harvest_summary_log_output <- as.matrix(setNames(harvest_summary_log[, c(2,4,5,7)], NULL))

Col2==ManagementArea
Col4==HarvestedSites
Col5==TotalCohortsCompleteHarvest
Col7==TotalBiomassHarvested

NO DATA!!!
0 observations of 76 variables
```

```
c2. QAQCrun3 "NECN_succession_log.csv" in R
open "NECN_succession_log.csv" in R ==>
> QAQCrun3_NECN_succession_log_output <- as.matrix(setNames(NECN_succession_log[, c(3,6,25,26)], NULL))

Col3==EcoregionIndex
Col6==SOMTC
Col25==C_SOM1surf
Col26==C_SOM1soil

       [,1]    [,2]  [,3]   [,4]
```

```
 [1,]    0 17164.4 785.5 3363.3
 [2,]    1 15394.7 818.0 2947.8
 [3,]    0 15903.6 273.7 3223.3
 [4,]    1 14069.4 221.3 2820.1
 [5,]    0 15424.3 308.5 3141.4
 [6,]    1 13244.6 184.5 2694.5
 [7,]    0 14997.5 306.7 3057.9
 [8,]    1 12569.8 189.2 2570.9
 [9,]    0 14563.7 292.1 2966.8
[10,]    1 11700.7 138.7 2404.4
[11,]    0 13968.6 245.7 2845.5
[12,]    1 10766.8  99.5 2215.6
[13,]    0 13267.8 206.0 2700.3
[14,]    1  9791.4  63.5 2011.8
```

```
c3. QAQCrun3 "fire/fire-summary-log.csv" in R
open "fire/fire-summary-log.csv" in R ==>
> QAQCrun3_fire_summary_log_output <- as.matrix(setNames(fire_summary_log[ ,1:5], NULL))

Col==Time
Col2==TotalSitesBurned
Col3==TotalNumberEvents
Col4==MN101
Col5==MN102

     [,1] [,2] [,3] [,4] [,5]
[1,]    5 9104  318 1635 7469
[2,]   10  776  515   80  696
[3,]   15 1570  758  181 1389
[4,]   20 2467  908  242 2225
[5,]   25 2269  877  290 1979
[6,]   30 2008  883  263 1745
```

```
d. (LANDIS-II) QAQC run4
==> "NECN-succession.txt"
==> "base-fire_NECN.txt"
==> modified "biomass-harvest_SalvageLog_QAQCPrescription.txt"
    HarvestImplementations
>>Mgmt Area Prescription Harvest Area BeginTime EndTime
>>-------------------------------------------------
>>1 SalvageLogger1 50%
1 SalvageLogger2 50%
>>3 SalvageLogger1 50%
>>3 SalvageLogger2 50%
>>1 MaxAgeClearcut 5% 0 15
>>1 MaxAgeClearcut 10% 15 30
```

```
d1. QAQCrun4 "harvest/harvest_summary_log.csv" in R
open "harvest/harvest_summary_log.csv" in R ==>
> QAQCrun4_harvest_summary_log_output <- as.matrix(setNames(harvest_summary_log[, c(2,4,5,7)], NULL))

Col2==ManagementArea
```

```
Col4==HarvestedSites
Col5==TotalCohortsCompleteHarvest
Col7==TotalBiomassHarvested

NO DATA!!!
0 observations of 76 variables


d2. QAQCrun4 "NECN_succession_log.csv" in R
open "NECN_succession_log.csv" in R ==>
> QAQCrun4_NECN_succession_log_output <- as.matrix(setNames(NECN_succession_log[, c(3,6,25,26)], NULL))

Col3==EcoregionIndex
Col6==SOMTC
Col25==C_SOM1surf
Col26==C_SOM1soil

      [,1]    [,2]  [,3]   [,4]
 [1,]    0 17164.4 785.5 3363.3
 [2,]    1 15394.7 818.0 2947.8
 [3,]    0 15903.6 273.7 3223.3
 [4,]    1 14069.4 221.3 2820.1
 [5,]    0 15424.3 308.5 3141.4
 [6,]    1 13244.6 184.5 2694.5
 [7,]    0 14997.5 306.7 3057.9
 [8,]    1 12569.8 189.2 2570.9
 [9,]    0 14563.7 292.1 2966.8
[10,]    1 11700.7 138.7 2404.4
[11,]    0 13968.6 245.7 2845.5
[12,]    1 10766.8  99.5 2215.6
[13,]    0 13267.8 206.0 2700.3
[14,]    1  9791.4  63.5 2011.8


d3. QAQCrun4 "fire/fire-summary-log.csv" in R
open "fire/fire-summary-log.csv" in R ==>
> QAQCrun4_fire_summary_log_output <- as.matrix(setNames(fire_summary_log[ ,1:5], NULL))

Col==Time
Col2==TotalSitesBurned
Col3==TotalNumberEvents
Col4==MN101
Col5==MN102

      [,1] [,2] [,3] [,4] [,5]
[1,]    5 9104  318 1635 7469
[2,]   10  776  515   80  696
[3,]   15 1570  758  181 1389
[4,]   20 2467  908  242 2225
[5,]   25 2269  877  290 1979
[6,]   30 2008  883  263 1745




e. (LANDIS-II) QAQC run5
==> "NECN-succession.txt"
```

```
==> "base-fire_NECN.txt"
==> modified "biomass-harvest_SalvageLog_QAQCPrescription.txt"

Prescription SalvageLogger1
    StandRanking TimeSinceDisturbance
    TimeSinceLastFire 75
    SiteSelection     Complete
    CohortsRemoved    ClearCut


Prescription SalvageLogger2
    StandRanking TimeSinceDisturbance
    TimeSinceLastFire 5
    SiteSelection     Complete
    CohortsRemoved    ClearCut


>> ----------------------------------------
>> PRESCRIPTION IMPLEMENTATION
>> ----------------------------------------
    HarvestImplementations
>>Mgmt Area Prescription Harvest Area BeginTime EndTime
>>--------------------------------------------------
1 SalvageLogger1 50%
1 SalvageLogger2 50%
3 SalvageLogger1 50%
3 SalvageLogger2 50%
>>1 MaxAgeClearcut 5% 0 15
>>1 MaxAgeClearcut 10% 15 30



e1. QAQCrun5 "harvest/harvest_summary_log.csv" in R
open "harvest/harvest_summary_log.csv" in R ==>
> QAQCrun5_harvest_summary_log_output <- as.matrix(setNames(harvest_summary_log[, c(2,4,5,7)], NULL))

Col2==ManagementArea
Col4==HarvestedSites
Col5==TotalCohortsCompleteHarvest
Col7==TotalBiomassHarvested

> QAQCrun5_harvest_summary_log_output
     [,1] [,2] [,3] [,4]

NO DATA!!!
0 observations of 76 variables


e2. QAQCrun5 "NECN_succession_log.csv" in R
open "NECN_succession_log.csv" in R ==>
> QAQCrun5_NECN_succession_log_output <- as.matrix(setNames(NECN_succession_log[, c(3,6,25,26)], NULL))

Col3==EcoregionIndex
Col6==SOMTC
Col25==C_SOM1surf
Col26==C_SOM1soil

> QAQCrun5_NECN_succession_log_output
      [,1]    [,2]  [,3]   [,4]
 [1,]    0 17164.4 785.5 3363.3
 [2,]    1 15394.7 818.0 2947.8
```

```
 [3,]    0 15903.6 273.7 3223.3
 [4,]    1 14069.4 221.3 2820.1
 [5,]    0 15424.3 308.5 3141.4
 [6,]    1 13244.6 184.5 2694.5
 [7,]    0 14997.5 306.7 3057.9
 [8,]    1 12569.8 189.2 2570.9
 [9,]    0 14563.7 292.1 2966.8
[10,]    1 11700.7 138.7 2404.4
[11,]    0 13968.6 245.7 2845.5
[12,]    1 10766.8  99.5 2215.6
[13,]    0 13267.8 206.0 2700.3
[14,]    1  9791.4  63.5 2011.8


e3. QAQCrun5 "fire/fire-summary-log.csv" in R
open "fire/fire-summary-log.csv" in R ==>
> QAQCrun5_fire_summary_log_output <- as.matrix(setNames(fire_summary_log[ ,1:5], NULL))

Col==Time
Col2==TotalSitesBurned
Col3==TotalNumberEvents
Col4==MN101
Col5==MN102

> QAQCrun5_fire_summary_log_output
     [,1] [,2] [,3] [,4] [,5]
[1,]    5 9104  318 1635 7469
[2,]   10  776  515   80  696
[3,]   15 1570  758  181 1389
[4,]   20 2467  908  242 2225
[5,]   25 2269  877  290 1979
[6,]   30 2008  883  263 1745


###############
QAQC
map checks
##################

a1. QAQCrun1 BiomassMaps "harvest/harvest-biomass-removed-{timestep}.img" maps in QGIS
Acceptable outputs (see PWL50_BiomassMaps_QAQCrun1.png)

a2. QAQCrun1 PrescriptionMaps "harvest/harvest-prescripts-{timestep}.img" maps in QGIS
Acceptable outputs (see PWL50_PrescriptionMaps_QAQCrun1.png)



b1. QAQCrun5 PrescriptionMaps "harvest/harvest-prescripts-{timestep}.img" maps in QGIS
ALL BLANK!! (nan, 0) OR (nan, 1)

b2. QAQCrun5 BiomassMaps "harvest/harvest-biomass-removed-{timestep}.img" maps in QGIS
ALL BLANK!! (nan, 0) OR (nan, 1)

b3. QAQCrun5 FireMaps "fire/fire-severity-{timestep}.img" maps in QGIS
Acceptable outputs (see PWL50_FireMaps_QAQCrun5.png)



######################
QAQC
consistency/change tests
```

```
#######################

a. consistency and change of runs checks (by differencing)

---- NECN_succession_log_output.csv --------------------------------------

Col3==EcoregionIndex
Col6==SOMTC
Col25==C_SOM1surf
Col26==C_SOM1soil


QAQCrun5_NECN_succession_log_output-QAQCrun4_NECN_succession_log_output
      [,1] [,2] [,3] [,4]
 [1,]    0    0    0    0
 [2,]    0    0    0    0
 [3,]    0    0    0    0
 [4,]    0    0    0    0
 [5,]    0    0    0    0
 [6,]    0    0    0    0
 [7,]    0    0    0    0
 [8,]    0    0    0    0
 [9,]    0    0    0    0
[10,]    0    0    0    0
[11,]    0    0    0    0
[12,]    0    0    0    0
[13,]    0    0    0    0
[14,]    0    0    0    0

QAQCrun5_NECN_succession_log_output-QAQCrun3_NECN_succession_log_output
      [,1] [,2] [,3] [,4]
 [1,]    0    0    0    0
 [2,]    0    0    0    0
 [3,]    0    0    0    0
 [4,]    0    0    0    0
 [5,]    0    0    0    0
 [6,]    0    0    0    0
 [7,]    0    0    0    0
 [8,]    0    0    0    0
 [9,]    0    0    0    0
[10,]    0    0    0    0
[11,]    0    0    0    0
[12,]    0    0    0    0
[13,]    0    0    0    0
[14,]    0    0    0    0


QAQCrun5_NECN_succession_log_output-QAQCrun2_NECN_succession_log_output
      [,1]   [,2]  [,3]  [,4]
 [1,]    0    0.0   0.0   0.0
 [2,]    0    0.0   0.0   0.0
 [3,]    0  205.9  33.9  35.9
 [4,]    0   12.1   2.1   2.1
 [5,]    0  684.7 103.0 121.5
 [6,]    0   52.3   9.2   8.7
 [7,]    0 1382.4 199.6 226.5
 [8,]    0  138.8  23.3  21.1
 [9,]    0 2360.2 257.0 416.5
[10,]    0  233.0  27.7  38.1
[11,]    0 3128.2 240.5 588.1
[12,]    0  348.2  39.2  57.4
```

```
[13,]    0 3643.1 205.6 717.3
[14,]    0  417.7  27.7  78.1

QAQCrun5_NECN_succession_log_output-QAQCrun1_NECN_succession_log_output
      [,1]   [,2]  [,3]  [,4]
 [1,]    0    0.0   0.0   0.0
 [2,]    0    0.0   0.0   0.0
 [3,]    0  205.9  33.9  35.9
 [4,]    0   12.1   2.1   2.1
 [5,]    0  684.7 103.0 121.5
 [6,]    0   52.3   9.2   8.7
 [7,]    0 1264.1 155.6 221.5
 [8,]    0  102.7  12.3  18.3
 [9,]    0 1917.9 166.3 360.0
[10,]    0  116.9   6.8  22.4
[11,]    0 2334.8 136.7 458.4
[12,]    0  122.4   4.3  24.8
[13,]    0 2573.8 111.8 520.8
[14,]    0  105.1  -0.5  22.8


---- fire_summary_log_output.csv ----------------------------------------

Col==Time
Col2==TotalSitesBurned
Col3==TotalNumberEvents
Col4==MN101
Col5==MN102

> QAQCrun5_fire_summary_log_output-QAQCrun4_fire_summary_log_output
     [,1] [,2] [,3] [,4] [,5]
[1,]    0    0    0    0    0
[2,]    0    0    0    0    0
[3,]    0    0    0    0    0
[4,]    0    0    0    0    0
[5,]    0    0    0    0    0
[6,]    0    0    0    0    0

> QAQCrun5_fire_summary_log_output-QAQCrun3_fire_summary_log_output
     [,1] [,2] [,3] [,4] [,5]
[1,]    0    0    0    0    0
[2,]    0    0    0    0    0
[3,]    0    0    0    0    0
[4,]    0    0    0    0    0
[5,]    0    0    0    0    0
[6,]    0    0    0    0    0

> QAQCrun5_fire_summary_log_output-QAQCrun2_fire_summary_log_output
     [,1] [,2] [,3] [,4] [,5]
[1,]    0    0    0    0    0
[2,]    0    7    0    3    4
[3,]    0   74  -21   34   40
[4,]    0  503   21  196  307
[5,]    0  564  -40  256  308
[6,]    0 1072   36  263  809

> QAQCrun5_fire_summary_log_output-QAQCrun1_fire_summary_log_output
     [,1] [,2] [,3] [,4] [,5]
[1,]    0    0    0    0    0
[2,]    0    7    0    3    4
[3,]    0   74  -21   34   40
```

```
[4,]    0  255   24  103  152
[5,]    0  177   24  157   20
[6,]    0  243   15  128  115
```

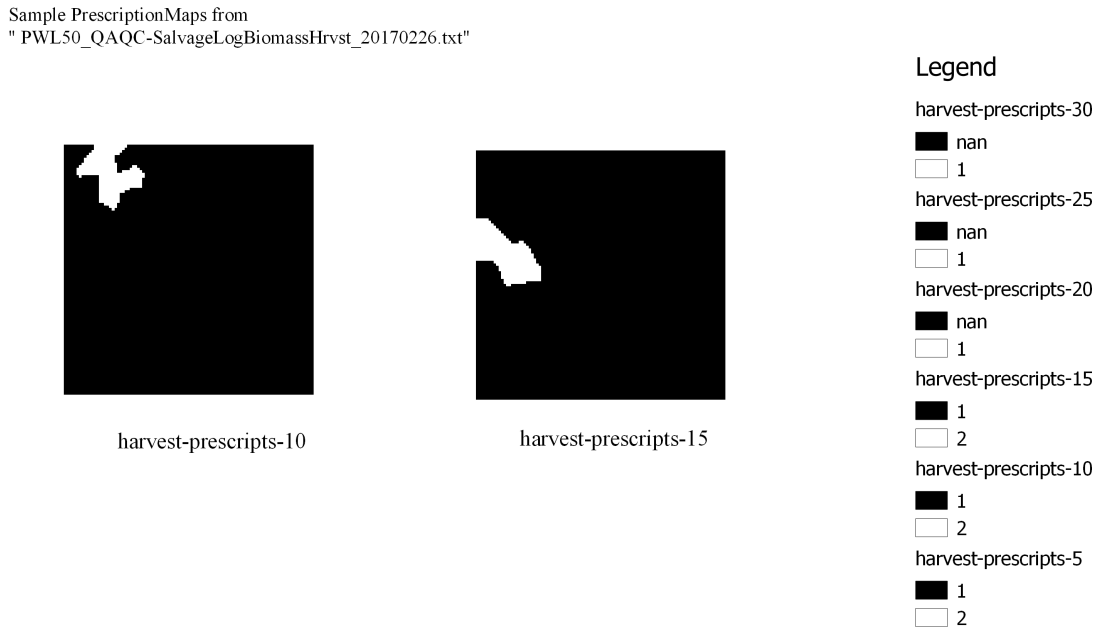

Figure 1

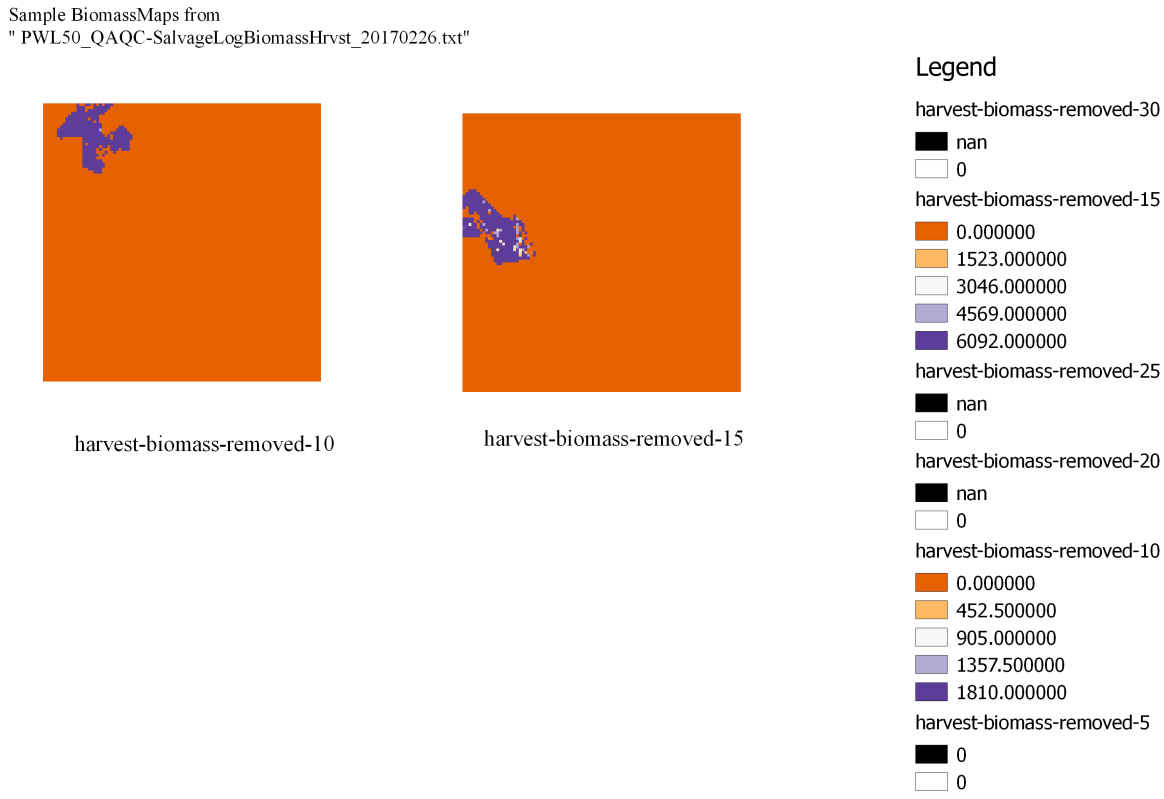
Sample BiomassMaps from
" PWL50_QAQC-SalvageLogBiomassHrvst_20170226.txt"
harvest-biomass-removed-10
harvest-biomass-removed-15
Legend
harvest-biomass-removed-30
nan
0
harvest-biomass-removed-15
0.000000
1523.000000
3046.000000
4569.000000
6092.000000
harvest-biomass-removed-25
nan
0
harvest-biomass-removed-20
nan
0
harvest-biomass-removed-10
0.000000
452.500000
905.000000
1357.500000
1810.000000
harvest-biomass-removed-5
0
0

Figure 2

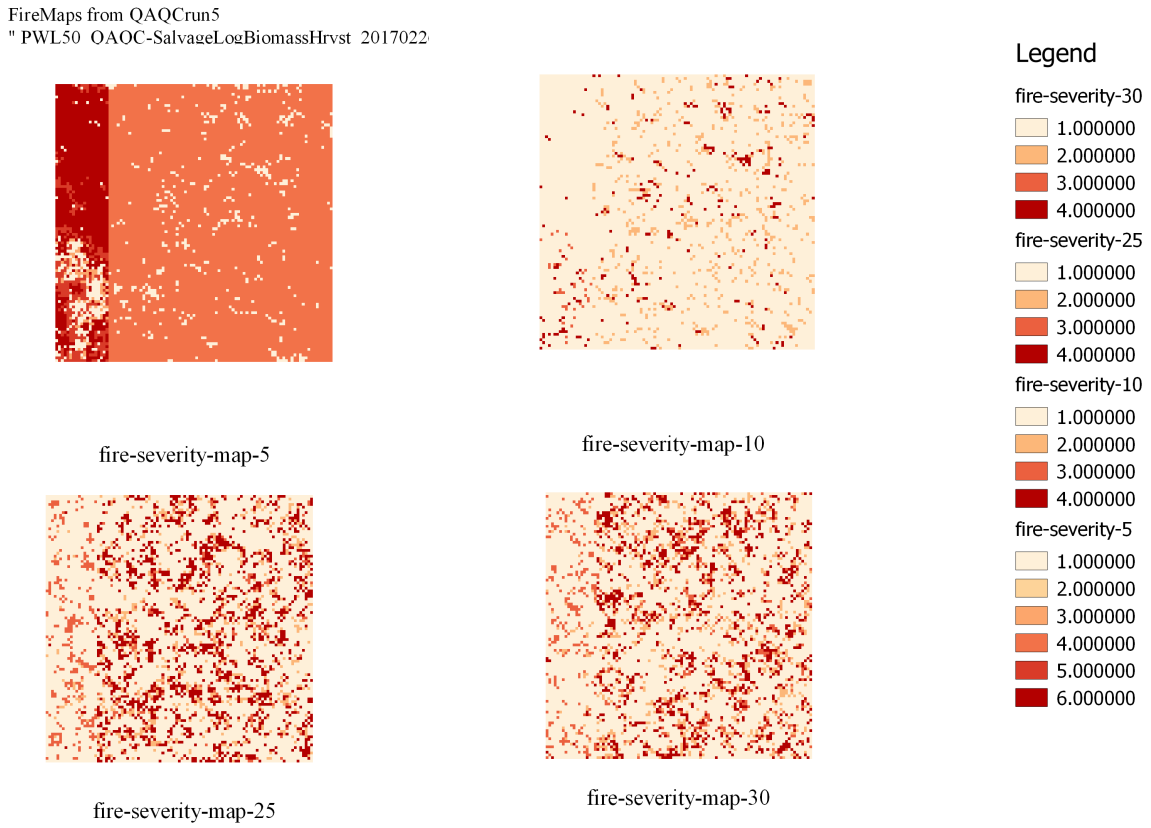
FireMaps from QAQCrun5
" PWL50_QAQC-SalvageLogBiomassHrvst_2017022
fire-severity-map-5
fire-severity-map-10
fire-severity-map-25
fire-severity-map-30
Legend
fire-severity-30
1.000000
2.000000
3.000000
4.000000
fire-severity-25
1.000000
2.000000
3.000000
4.000000
fire-severity-10
1.000000
2.000000
3.000000
4.000000
fire-severity-5
1.000000
2.000000
3.000000
4.000000
5.000000
6.000000

Figure 3

References