

```

1 Index: R/AdjustedAreas.R
2 =====
3 --- R/AdjustedAreas.R (revision 4453)
4 +++ R/AdjustedAreas.R (revision 4454)
5 @@ -102,7 +102,7 @@
6     # Number of sample points in the mapped classes
7     if (debug_er) print(table(aa_sample$predicted))
8
9 -
10 +
11     # Get the total area mapped [ha]
12     A_mapped <- sum(lcc_mapped_areas[, 2])
13
14 @@ -118,8 +118,8 @@
15     mapped_class <- c("111","112","171","172","555", "711","712","777",
16     "1115", "1125", "7775")
17     aa_sample$predicted <- factor(aa_sample$predicted )
18     aa_sample$observed <- factor(aa_sample$observed,levels =
19     reference_codes )
20 -
21 +
22     # Compute the sample error matrix (counts); map class in rows,
23     reference class in columns
24     err <- with(aa_sample, table(predicted, observed))
25
26 @@ -169,7 +169,7 @@
27     "AR Upland",
28     "Stable NF" # NF = Non-Forest
29     ),
30 -
31 +
32     # Mapped areas of change classes [ha]
33     area_mapped_ha = lcc_mapped_areas[match(reference_codes,
34     lcc_mapped_areas$class_code), 2],
35     # Estimated areas of change classes [ha]
36
37 Index: R/CalcFRLDegradation.R
38 =====
39 --- R/CalcFRLDegradation.R (revision 4453)
40 +++ R/CalcFRLDegradation.R (revision 4454)
41 @@ -3,13 +3,14 @@
42 calcFRLDegradation <- function() {
43     # Result table for the net source 'forest degradation'
44     rs_fd <- data.frame(
45     - source = c("FD_Logging_net", "FD_Biomass_burning", "FD_total"),
46     + source = c("FD_Logging_net", "FD_Biomass_burning",
47     "FD_NaturalForest", "FD_total"),
48     # Estimates (net emissions from logging in Natural Forest, emissions
49     from
50     - # biomass burning in Softwood Plantations and total)
51     + # biomass burning in Softwood Plantations, Natural Forest
52     Degradation and total)
53     est = c(
54     FRLFelling$fd_lg_aane, # Net emissions from logging (FD)
55     FRLBurning$fd_bb_aae, # Emissions from biomass burning (FD)

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49 - FRLFelling$fd_lg_aane + FRLBurning$fd_bb_aae # Both
50 + FRLNaturalForestDegradation$fd_nf_aae, # Emissions from Natural forest degradation (FD)
51 + FRLFelling$fd_lg_aane + FRLBurning$fd_bb_aae + FRLNaturalForestDegradation$fd_nf_aae # All
52 ),
53 # Lower 90%-confidence limits
54 lci = c(
55 @@ -19,8 +20,12 @@
56     quantile(FRLBurning$v_fd_bb_aae, # MC estimates fire
57     probs = FRLParams$qlci
58     ),
59 + quantile(FRLNaturalForestDegradation$v_fd_nf_aae, # MC estimates Natural Forest degradation
60 +     probs = FRLParams$qlci
61 +     ),
62     quantile(FRLFelling$v_fd_lg_aane + # MC estimates net em. logging
63 - FRLBurning$v_fd_bb_aae, # and MC estimates fire
64 + FRLBurning$v_fd_bb_aae + # and MC estimates fire
65 + FRLNaturalForestDegradation$v_fd_nf_aae, # and MC estimates natural forest degradation
66     probs = FRLParams$qlci
67     ),
68 ),
69 @@ -32,8 +37,12 @@
70     quantile(FRLBurning$v_fd_bb_aae, # MC estimates fire
71     probs = FRLParams$quci
72     ),
73 + quantile(FRLNaturalForestDegradation$v_fd_nf_aae, # MC estimates Natural Forest degradation
74 +     probs = FRLParams$quci
75 +     ),
76     quantile(FRLFelling$v_fd_lg_aane + # MC estimates net em. logging
77 - FRLBurning$v_fd_bb_aae, # and MC estimates fire
78 + FRLBurning$v_fd_bb_aae + # and MC estimates fire
79 + FRLNaturalForestDegradation$v_fd_nf_aae, # and MC estimates natural forest degradation
80     probs = FRLParams$quci
81     )
82 )
83 Index: R/CalcFRLNaturalForestDegradation.R
84 =====
85 --- R/CalcFRLNaturalForestDegradation.R (nonexistent)
86 +++ R/CalcFRLNaturalForestDegradation.R (revision 4454)
87 @@ -0,0 +1,61 @@
88 +# dnf_area <- list()
89 +# dnf_area$yearly <- 874.735
90 +# dnf_area$se <- 245.872
91 +# dnf_area$uci <- 874.735 + 404.4594
92 +# dnf_area$lci <- 874.735 - 404.4594
93 +
94 +#' @export
95 +calcFRLNaturalForestDegradation <- function() {
96 + # Emissions from natural forest degradation
97 + fd_nf_aae <- CalcEstEmNFDeg(dnf_area$yearly, EFNFDeg,

```

```

RootToShootTropRain )
98 + if (debug_frl) print(fd_nf_aae)
99 +
100 + # Uncertainty analysis
101 + # Create vector
102 + v_fd_nf_aae <- vector()
103 +
104 + # Monte Carlo simulation
105 + for (i in 1:FRLParams$runs) { # i <- 1
106 +   areai <- rnorm(
107 +     n = 1, mean = dnf_area$yearly,
108 +     sd = dnf_area$se
109 +   )
110 +
111 +   EFNFDegi <- rnorm(
112 +     n = 1, mean = EFNFDeg,
113 +     sd = EFNFDeg_SD
114 +   )
115 +
116 +   R2shooti <- rtriangle(
117 +     n = 1, theta = RootToShootTropRain,
118 +     lower = RootToShootTropRain - (RootToShootTropRain *
errRootToShootTropRain),
119 +     upper = RootToShootTropRain + (RootToShootTropRain *
errRootToShootTropRain)
120 +   )
121 +
122 +   # Compute average annual emissions from natural forest degradation
123 +   v_fd_nf_aae[i] <- CalcEstEmNFDeg(areai, EFNFDegi, R2shooti)
124 + }
125 +
126 + # Compute 90%-confidence bounds
127 + lcinfdc <- quantile(v_fd_nf_aae, prob = c(FRLParams$qlci))
128 + ucinfdc <- quantile(v_fd_nf_aae, prob = c(FRLParams$quci))
129 +
130 + # Result table 'emissions from nfdwood'
131 + rs_fd_nf <- data.frame(
132 +   aa_em_tco2e_yr = fd_nf_aae,
133 +   lci_aa_em_tco2e_yr = lcinfdc,
134 +   uci_aa_em_tco2e_yr = ucinfdc
135 + )
136 +
137 + row.names(rs_fd_nf) <- "1"
138 +
139 + # Show result table for fuelwood
140 + if (debug_frl) print(rs_fd_nf)
141 +
142 + result <- list()
143 + result$rs_fd_nf <- rs_fd_nf
144 + result$fd_nf_aae <- fd_nf_aae
145 + result$v_fd_nf_aae <- v_fd_nf_aae
146 +
147 + return(result)
148 +}
149

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150 Property changes on: R/CalcFRLNaturalForestDegradation.R
151
152 Added: svn:eol-style
153 ## -0,0 +1 ##
154 +native
155 \ No newline at end of property
156 Index: R/CalcFRLTable.R
157 =====
158 --- R/CalcFRLTable.R      (revision 4453)
159 +++ R/CalcFRLTable.R      (revision 4454)
160 @@ -89,6 +89,7 @@
161      FRLFelling$rs_fd_lg[1, 2], # FD logging gross emissions
162      FRLBurning$rs_fd_bb[1, 1], # FD fire gross emissions
163      FRLFuelwood$rs_fd_fu[1, 1], # FD fuelwood gross emissions
164 +    FRLNaturalForestDegradation$rs_fd_nf[1,1], # FD natural forest
165      0, # EC AR gross emissions
166      FRLPlantations$rs_ec_pl[3, 2]
167 )
168 @@ -98,6 +99,7 @@
169      FRLFelling$v_fd_lg_aae + # MC Emissions FD logging
170      FRLBurning$v_fd_bb_aae + # MC Emissions FD fire
171      FRLFuelwood$v_fd_fu_aae + # MC Emissions FD fuelwood
172 +    FRLNaturalForestDegradation$v_fd_nf_aae + # MC Emissions FD Natural
173 Forest
174      FRLHardwoodPlantations$v_ec_hw_aae + # MC Emissions EC Hardwood
175      FRLSoftwoodPlantations$v_ec_sw_aae # MC Emissions EC Softwood
176
177 @@ -107,6 +109,7 @@
178      FRLFelling$rs_fd_lg[2, 2], # FD logging gross removals
179      0, # FD fire gross removals
180      0, # FD fuelwood gross removals
181 +    0, # FD natural forest removals
182      FRLHardwoodPlantations$rs_ec_ar[1, 1], # EC AR gross removals
183      FRLPlantations$rs_ec_pl[6, 2]
184 )
185 @@ -148,6 +151,7 @@
186      FRLDeforestation$rs_df[1, 1], # DF gross emission
187      FRLFelling$rs_fd_lg[1, 2], # FD logging gross emissions
188      FRLBurning$rs_fd_bb[1, 1], # FD fire gross emissions
189 +    FRLNaturalForestDegradation$rs_fd_nf[1,1], # FD natural forest
190      0, # EC AR gross emissions
191      FRLPlantations$rs_ec_pl[3, 2]
192 )
193 @@ -156,6 +160,7 @@
194 v_aa_emissions_tco2e_yr <- (FRLDeforestation$v_df_L_aae +
195 FRLDeforestation$v_df_U_aae) + # MC Emissions deforestation
196      FRLFelling$v_fd_lg_aae + # MC Emissions FD logging
197      FRLBurning$v_fd_bb_aae + # MC Emissions FD fire
198 +    FRLNaturalForestDegradation$v_fd_nf_aae + # MC Emissions FD Natural
199 Forest
200      FRLHardwoodPlantations$v_ec_hw_aae + # MC Emissions EC Hardwood
201      FRLSoftwoodPlantations$v_ec_sw_aae # MC Emissions EC Softwood
202
203 @@ -164,6 +169,7 @@
204      0, # DF gross removals

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202         FRLFelling$rs_fd_lg[2, 2], # FD logging gross removals
203         0, # FD fire gross removals
204 +       0, # FD natural forest removals
205         FRLHardwoodPlantations$rs_ec_ar[1, 1], # EC AR gross removals
206         FRLPlantations$rs_ec_pl[6, 2]
207     )
208 @@ -204,15 +210,17 @@
209     # DF      = deforestation
210     # FDL     = forest degradation (logging)
211     # FDF     = forest degradation (fire)
212 +   # FDNF    = natural forest degradation
213     # FUEL    = fuelwood
214     # ECAR    = enhancement of forest carbon stocks
215     (afforestation/reforestation)
216     # ECHS    = enhancement of forest carbon stocks (Hard- and Softwood
217     Plantations)
218 -   source_sink = c("DF", "FDL", "FDF", "FUEL", "ECAR", "ECHS"),
219 +   source_sink = c("DF", "FDL", "FDF", "FUEL", "FDNF", "ECAR", "ECHS"),
220     description = c(
221         "Deforestation",
222         "Forest degradation (logging)",
223         "Forest degradation (fire)",
224         "Fuelwood consumption",
225 +       "Forest degradation (natural forest)",
226         "Enhancement of forest carbon stocks (afforestation/reforestation)",
227         "Enhancement of forest carbon stocks (Hard- and Softwood
228         Plantations)"
229     )
230 @@ -231,6 +239,7 @@
231     "FDL",
232     "FDF",
233     "FUEL",
234 +   "FDNF",
235     "ECAR",
236     "ECHS"
237 ),
238 @@ -241,6 +250,7 @@
239     FRLFelling$rs_fd_lg[1, 2], # FD logging gross emissions
240     FRLBurning$rs_fd_bb[1, 1], # FD fire gross emissions
241     FRLFuelwood$rs_fd_fu[1, 1], # FD fuelwood gross emissions
242 +   FRLNaturalForestDegradation$rs_fd_nf[1,1], # FD natural forest
243     0, # EC AR gross emissions
244     FRLPlantations$rs_ec_pl[3, 2]
245 ), # EC Plantations gross emissions
246 @@ -251,6 +261,7 @@
247     FRLFelling$rs_fd_lg[1, 3],
248     FRLBurning$rs_fd_bb[1, 2],
249     FRLFuelwood$rs_fd_fu[1, 2],
250 +   FRLNaturalForestDegradation$rs_fd_nf[1,2],
251     0,
252     FRLPlantations$rs_ec_pl[3, 3]
253 ),
254 @@ -261,6 +272,7 @@
255     FRLFelling$rs_fd_lg[1, 4],
256     FRLBurning$rs_fd_bb[1, 3],

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```

254     FRLFuelwood$rs_fd_fu[1, 3],
255 +   FRLNaturalForestDegradation$rs_fd_nf[1,3],
256     0,
257     FRLPlantations$rs_ec_pl[3, 4]
258   ),
259 @@ -271,6 +283,7 @@
260     FRLFelling$rs_fd_lg[2, 2], # FD logging gross removals
261     0, # FD fire gross removals
262     0, # FD fuelwood gross removals
263 +   0, # FD natural forest removals
264     FRLHardwoodPlantations$rs_ec_ar[1, 1], # EC AR gross removals
265     FRLPlantations$rs_ec_pl[6, 2]
266   ), # EC Plantations gross removals
267 @@ -281,6 +294,7 @@
268     FRLFelling$rs_fd_lg[2, 3],
269     0,
270     0,
271 +   0,
272     FRLHardwoodPlantations$rs_ec_ar[1, 2],
273     FRLPlantations$rs_ec_pl[6, 3]
274   ),
275 @@ -291,6 +305,7 @@
276     FRLFelling$rs_fd_lg[2, 4],
277     0,
278     0,
279 +   0,
280     FRLHardwoodPlantations$rs_ec_ar[1, 3],
281     FRLPlantations$rs_ec_pl[6, 4]
282   ),
283 @@ -301,6 +316,7 @@
284     FRLFelling$rs_fd_lg[3, 2], # FD logging net emissions
285     FRLBurning$rs_fd_bb[1, 1], # FD fire net emissions
286     FRLFuelwood$rs_fd_fu[1, 1], # FD fuelwood net emissions
287 +   FRLNaturalForestDegradation$rs_fd_nf[1,1], # FD natural forest
288     FRLHardwoodPlantations$rs_ec_ar[1, 1], # EC AR net emissions
289     FRLPlantations$rs_ec_pl[9, 2]
290   ), # EC Plantations net emissions
291 @@ -311,6 +327,7 @@
292     FRLFelling$rs_fd_lg[3, 3],
293     FRLBurning$rs_fd_bb[1, 2],
294     FRLFuelwood$rs_fd_fu[1, 2],
295 +   FRLNaturalForestDegradation$rs_fd_nf[1,2],
296     FRLHardwoodPlantations$rs_ec_ar[1, 2],
297     FRLPlantations$rs_ec_pl[9, 3]
298   ),
299 @@ -321,6 +338,7 @@
300     FRLFelling$rs_fd_lg[3, 4],
301     FRLBurning$rs_fd_bb[1, 3],
302     FRLFuelwood$rs_fd_fu[1, 3],
303 +   FRLNaturalForestDegradation$rs_fd_nf[1,3],
304     FRLHardwoodPlantations$rs_ec_ar[1, 3],
305     FRLPlantations$rs_ec_pl[9, 4]
306   )
307 @@ -343,9 +361,11 @@
308     # Gross emissions forest degradation (FD)

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```

.....
309     aaefd <- FRLFelling$rs_fd_lg[1, 2] + # Gross emissions FD logging
310     FRLBurning$rs_fd_bb[1, 1] + # Gross emissions FD biomass burning
311 +   FRLNaturalForestDegradation$rs_fd_nf[1,1] + # Gross emissions FD      ↗
    natural forest
312     FRLFuelwood$rs_fd_fu[1, 1] # Gross emissions FD fuelwood
313     v_aaefd <- FRLFelling$v_fd_lg_aae + # MC gross emissions logging
314     FRLBurning$v_fd_bb_aae + # MC gross emissions biomass burning
315 +   FRLNaturalForestDegradation$v_fd_nf_aae + # MC gross emissions FD      ↗
    natural forest
316     FRLFuelwood$v_fd_fu_aae # MC gross emissions fuelwood
317     # Lower confidence limit
318     lciaaefd <- quantile(v_aaefd, probs = FRLParams$qlci)
319 @@ -365,11 +385,13 @@
320
321     aaenefd <- FRLFelling$rs_fd_lg[1, 2] + # Gross emissions FD logging
322     FRLBurning$rs_fd_bb[1, 1] + # Gross emissions FD fire
323 +   FRLNaturalForestDegradation$rs_fd_nf[1,1] + # Gross emissions FD      ↗
    natural forest
324     FRLFelling$rs_fd_lg[2, 2] # Gross removals FD logging
325
326     aaenefdf <- aaenefd
327     v_aaenefd <- FRLFelling$v_fd_lg_aae + # MC gross emissions FD logging
328 -   FRLBurning$v_fd_bb_aae - # MC gross emissions FD fire
329 +   FRLBurning$v_fd_bb_aae + # MC gross emissions FD fire
330 +   FRLNaturalForestDegradation$v_fd_nf_aae - # MC gross emissions FD      ↗
    natural forest
331     FRLFelling$v_fd_lg_aar # MC gross removals FD logging
332     # Lower confidence limit
333     lciaaenefd <- quantile(v_aaenefd, probs = FRLParams$qlci)
334 @@ -381,7 +403,7 @@
335
336
337     frl_IncludingFuel <- calcFRLTable_IncludingFuel()
338 -   calcFRLContributions(frl_IncludingFuel, c("DF", "FDL", "FDF", "FUEL",      ↗
    "ECAR", "ECHS"))
339 +   calcFRLContributions(frl_IncludingFuel, c("DF", "FDL", "FDF", "FUEL",      ↗
    "FDNF", "ECAR", "ECHS"))
340     # FRL table including all sources and sinks      ↗
.....
341     frl_table_data <- rbind(
342     frl_table[, -1],
343 @@ -402,10 +424,10 @@
344
345
346     frl_ExFuel <- calcFRLTable_ExFuel()
347 -   calcFRLContributions(frl_ExFuel, c("DF", "FDL", "FDF", "ECAR", "ECHS"))      ↗
348 +   calcFRLContributions(frl_ExFuel, c("DF", "FDL", "FDF", "FDNF", "ECAR",      ↗
    "ECHS"))
349     # FRL table including all sources and sinks      ↗
.....
350     frl_table_data <- rbind(
351 -   frl_table[-c(4,7),-1],
352 +   frl_table[-c(4,8),-1],
353     c(

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354     sum(frl_ExFuel$aa_emissions_tco2e_yr),
frl_ExFuel$lci_aa_emissions_tco2e_yr,
355     frl_ExFuel$uci_aa_emissions_tco2e_yr,
sum(frl_ExFuel$aa_removals_tco2e_yr),
356 @@ -415,7 +437,7 @@
357 )
358 )
359 frl_tableExFuel <- data.frame(
360 - source_sink = c(as.character(frl_table[-c(4,7),1]), "FRL"),
361 + source_sink = c(as.character(frl_table[-c(4,8),1]), "FRL"),
362   frl_table_data
363 )
364
365 @@ -431,6 +453,7 @@
366 "aaeDF", # Gross emissions deforestation
367 "aaeFD_L", # Gross emissions FD logging
368 "aaeFD_BSW", # Gross emissions FD biom. burning Softwood
369 + "aaeFD_NF", # Gross emissions FD natural forest
370 "aaeEC_HS", # Gross emissions EC Hard- & Softwood Plantations
371 "aae_Combined", # Gross emissions (all sources)
372
373 @@ -452,55 +475,58 @@
374     frl[1, 2], # aaeDF
375     frl[2, 2], # aaeFD_L
376     frl[3, 2], # aaeFD_BSW
377 - frl[5, 2], # aaeEC_HS
378 - sum(frl[c(1, 2, 3, 5), 2]), # aae_Combined
379 + frl[4, 2], # aaeFD_NF
380 + frl[6, 2], # aaeEC_HS
381 + sum(frl[c(1, 2, 3, 4, 6), 2]), # aae_Combined
382
383     frl[2, 5], # aarFD_L
384 - frl[4, 5], # aarEC_AR
385 - frl[5, 5], # aarEC_HS
386 - sum(frl[c(2, 4, 5), 5]), # aar_Combined
387 + frl[5, 5], # aarEC_AR
388 + frl[6, 5], # aarEC_HS
389 + sum(frl[c(2, 5, 6), 5]), # aar_Combined
390
391     frl[1, 8], # aaneDF
392 - sum(frl[2:3, 8]), # aaneFD
393 - sum(frl[c(4:5), 8]), # aaneEC
394 + sum(frl[2:4, 8]), # aaneFD
395 + sum(frl[c(5:6), 8]), # aaneEC
396
397 - frl[6, 8] # FRL
398 + frl[7, 8] # FRL
399 ),
400   lci_tco2e_yr = c(
401     frl[1, 3], # aaeDF
402     frl[2, 3], # aaeFD_L
403     frl[3, 3], # aaeFD_BSW
404 - frl[5, 3], # aaeEC_HS
405 - frl[6, 3], # aae_Combined
406 + frl[4, 3], # aaeFD_NF

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```

407 +     frl[6, 3], # aaeEC_HS
408 +     frl[7, 3], # aae_Combined
409
410     frl[2, 6], # aarFD_L
411 -     frl[4, 6], # aarEC_AR
412 -     frl[5, 6], # aarEC_HS
413 -     frl[6, 6], # aar_Combined
414 +     frl[5, 6], # aarEC_AR
415 +     frl[6, 6], # aarEC_HS
416 +     frl[7, 6], # aar_Combined
417
418     frl[1, 9], # aaneDF
419     lciaaneefd, # aaneFD
420     lciaaneec, # aaneEC
421
422 -     frl[6, 9] # FRL
423 +     frl[7, 9] # FRL
424 ),
425     uci_tco2e_yr = c(
426         frl[1, 4], # aaeDF
427         frl[2, 4], # aaeFD_L
428         frl[3, 4], # aaeFD_BSW
429 -         frl[5, 4], # aaeEC_HS
430 -         frl[6, 4], # aae_Combined
431 +         frl[4, 4], # aaeFD_NF
432 +         frl[6, 4], # aaeEC_HS
433 +         frl[7, 4], # aae_Combined
434
435         frl[2, 7], # aarFD_L
436 -         frl[4, 7], # aarEC_AR
437 -         frl[5, 7], # aarEC_HS
438 -         frl[6, 7], # aar_Combined
439 +         frl[5, 7], # aarEC_AR
440 +         frl[6, 7], # aarEC_HS
441 +         frl[7, 7], # aar_Combined
442
443         frl[1, 10], # aaneDF
444         uciaaneefd, # aaneFD
445         uciaaneec, # aaneEC
446
447 -         frl[6, 10] # FRL
448 +         frl[7, 10] # FRL
449     )
450 )
451 result <- list()
452 Index: R/Deforestation.R
453 =====
454 --- R/Deforestation.R (revision 4453)
455 +++ R/Deforestation.R (revision 4454)
456 @@ -1,12 +1,12 @@
457 #' Emissions From Deforestation Lowland and Upland
458 -#'
459 +#'
460 #' This function references Equations (11) and (12) in order to
    calculate the

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461 #' emissions from deforestation in upland or lowland areas. The resulting
462 #' emission is expressed in tCO2e.
463 -#'
464 +#'
465 #' @references [TBC - ERPD citation - Section 8.3.2]
466 -#'
467 #'
468 +#'
469 #' @param Area Area deforested in upland or lowland
470 #' @param EF Emissions Factor for deforestation in upland or lowland forest
471 #' tCO2e/ha
472 @@ -21,18 +21,18 @@
473 }
474
475 #' Emissions From Deforestation
476 -#'
477 +#'
478 #' This function references Equation (13) in order to calculate the
479 #' emissions from deforestation in upland and lowland areas. The resulting
480 #' emission is expressed in tCO2e.
481 -#'
482 +#'
483 #' @references [TBC - ERPD citation - Section 8.3.2]
484 -#'
485 #'
486 +#'
487 #' @param EstEmDeforUp Emission Estimate from Lowland Deforestation
488 #' @param EstEmDeforLow Emission Estimate from Upland Deforestation
489 #' @seealso [CalcEstEmDefor()]
490 -#' @return Net Emission from deforestation
491 +#' @return Net Emission from deforestation
492 #' @export
493 CalcGrossEmDefor <- function (EstEmDeforUp, EstEmDeforLow) {
494   return(EstEmDeforUp + EstEmDeforLow)
495 Index: R/Degradation.R
496 =====
497 --- R/Degradation.R (nonexistent)
498 +++ R/Degradation.R (revision 4454)
499 @@ -0,0 +1,68 @@
500 +#' Emissions from Degradation - Total of upland and lowland
501 +#'
502 +#' This function was added in Nov 2022 to incorporate work done by Eric Bullock
503 +#'
504 +#' Assessment of emissions from degradation using the
505 +#' reference data for activity data (area of degradation) and statistical
506 +#' inference using GEDI data and global biomass models for the emission
507 +#' factors.
508 +#'
509 +#' Date: 12/10/2022
510 +#' User: Eric Bullock
511 +#' Contact: eric.bullock@usda.gov
512 +#'
513 +#' Description: Preliminary assessment of the area of degradation, emission
514 +#' factors, and CO2 emissions during Fiji's reference period.

```

```

515 #'
516 #' Methodology
517 #' Forest type map: Data from Fiji's preliminary NFI and Landsat were used to
518 #' create a landcover and forest type map for 2006. The NFI data was used to
519 #' train a Random Forest classifier using Landsat metrics as predictors.
520 #' Classification was performed on Google Earth Engine.
521 #'
522 #' Activity data: Areas and standard errors were calculated using a the same
523 #' reference sample derived used for reporting emissions from deforestation. A
524 #' new class 'degradation' was defined as reference sample units that converted
525 #' from closed to open forest. Inference of the area and standard errors was
526 #' performed using an unbiased ratio estimator that accounts for differences
527 #' between the classes in a stratification and the reference label (Stehman,
528 #' 2014).
529 #'
530 #' Emission factors: Aboveground biomass density was calculated for open and
531 #' closed forests using the forest type map for defining the populations. Lidar
532 #' data from GEDI was used with global biomass models and hybrid statistical
533 #' inference to calculate mean aboveground biomass and uncertainty (Patterson
534 #' et al., 2019). Biomass density was converted to carbon and CO2e, and the
535 #' difference between classes defined the emission factor.
536 #'
537 #' @references [TBC]
538 #'
539 #' @param Area Area of degradation over the period
540 #' @param EF Biomass conversion and expansion factor for forest degradation
541 #' @param RootToShootRatio Root-to-shoot ratio for tropical forests
542 #' @return Emissions from Native Forest Degradation - tCO2e
543 #' @export
544 CalcEstEmNFDeg <- function(Area,
545 +                           EF,
546 +                           RootToShootRatio) {
547 + # Forest Degradation Biomass is the area times the AGB Emission factor and the below ground biomass
548 + Biomass <- Area * EF * (1 + RootToShootRatio)
549 + # Emissions from forest degradation for the year
550 + CO2e <- ConvBiomassToCO2e(Biomass)
551 + return(CO2e)
552 +}
553 +
554 #' Net emissions from Degradation of Natural Forests (tCO2e)
555 #'
556 #' @description This function used functions CalcEstEmNFDeg to calculate

```

```

net
557 +#' emissions from degradation Emissions are presented in tCO2e.
558 +#'
559 +#' @references [TBC - ERPD citation]
560 +#'
561 +#' @param EstEmNFDeg Emissions from degradation
562 +#' @seealso [CalcEstEmNFDeg()]
563 +#' @return Emissions from degradation of Natural Forests - tCO2e
564 +#' @export
565 +CalcNetEmRemsNFDeg <- function (EstEmNFDeg) {
566 +  return(EstEmNFDeg)
567 +}
568
569 Property changes on: R/Degradation.R
570
571 Added: svn:eol-style
572 ## -0,0 +1 ##
573 +native
574 \ No newline at end of property
575 Index: R/ER_Calculated_Values.R
576 =====
577 --- R/ER_Calculated_Values.R      (revision 4453)
578 +++ R/ER_Calculated_Values.R      (revision 4454)
579 @@ -58,6 +58,18 @@
580     result$EstRemFell
581   )
582
583 +  ## Yearly EMISSIONS from degradataion in natural forest (tCO2e)
584 +
585 +  result$EstEmNFDeg <- CalcEstEmNFDeg(
586 +    MonitoredValues$NFDegArea,
587 +    EFNFDeg,
588 +  )
589 +
590 +  result$NetEmRemsNFDeg <- CalcNetEmRemsNFDeg(
591 +    result$EstEmNFDeg
592 +  )
593 +
594 +
595 +  #####
596 +  ## 2.2 Biomass Burning
597
598 @@ -151,7 +163,8 @@
599     result$GrossEmDefor,
600     result$EstEmFell,
601     result$EstEmFire,
602 -    result$GrossEmFPln
603 +    result$GrossEmFPln,
604 +    result$EstEmNFDeg
605   )
606
607   # Gross Removals Total
608 @@ -167,7 +180,8 @@
609   result$EstEmRemsFDeg <- CalcEstEmRemsFDeg(
610     result$EstEmFell,

```

```

611     result$EstRemFell,
612 -   result$EstEmFire
613 +   result$EstEmFire,
614 +   result$EstEmNFDeg
615 )
616
617 # Enhancement Total
618 Index: R/Felling.R
619 =====
620 --- R/Felling.R (revision 4453)
621 +++ R/Felling.R (revision 4454)
622 @@ -1,5 +1,5 @@
623 #' Felling in Natural Forest
624 -#'
625 +#'
626 #' @description This function uses Equation (14) to calculate the gross
627 emissions from logging
628 #' activities. Emissions are presented in tco2e.
629 #'
630 @@ -7,8 +7,8 @@
631 #'
632 #' @param Volume Volume of area logged (ha)
633 #' @param EF Total Emissions Factor (TEF)
634 -#'
635 -#' @return Emissions from Logging of Natural Forests - tCO2e
636 +#'
637 +#' @return Emissions from Logging of Natural Forests - tCO2e
638 #' @export
639 CalcEstEmFell <- function(Volume, # volume of area logged
640                           EF # Total Emissions Factor
641 @@ -21,7 +21,7 @@
642 }
643
644 #' Removals from regrowth on Felled Areas in Natural Forests
645 -#'
646 +#'
647 #' @description This function uses Equation (16) to calculate the gross
648 removals from regrowth
649 #' on felled areas in natural forest. Emissions are presented in tCO2e.
650 #'
651 @@ -29,7 +29,7 @@
652 #'
653 #' @param Area Area of natural forest logged
654 #' @param MAIC Mean Annual Increment Carbon
655 -#' @return Removals from regrowth on Felled Areas in Natural Forests -
656 tCO2e
657 +#' @return Removals from regrowth on Felled Areas in Natural Forests -
658 tCO2e
659 #' @export
660 CalcEstRemFell <- function(Area, # area of natural forest logged
661                           MAIC # Mean Annual Increment Carbon
662 @@ -42,7 +42,7 @@
663 }
664
665 #' Net emissions from Logging of Natural Forests (tCO2e)

```

```

662 -#'
663 +#'
664 #' @description This function used functions CalcEstEmFell and
665 CalcEstRemFell to calculate net
666 #' emissions from logging. Emissions are presented in tCO2e.
667 @@ -49,7 +49,7 @@
668 #' @references [TBC - ERPD citation - Section 8.3.3.1]
669 #'
670 #' @param EstEmFell Emissions from logging
671 -#' @param EstRemFell Removals from regrowth on felled areas
672 +#' @param EstRemFell Removals from regrowth on felled areas
673 #' @seealso [CalcEstEmFell()]
674 #' @seealso [CalcEstRemFell()]
675 #' @return Emissions from Logging of Natural Forests - tCO2e
676 Index: R/Fiji_Constants_from_Reference_Level.R
677 =====
678 --- R/Fiji_Constants_from_Reference_Level.R (revision 4453)
679 +++ R/Fiji_Constants_from_Reference_Level.R (revision 4454)
680 @@ -58,6 +58,26 @@
681 #' @export
682 ErrAreaFell <- 0.25 # Relative error in area, felling in Natural Forest
683 (was param.errlnf)
684
685 +# Natural Forest Degradation
686 +
687 +#' @export
688 +EFNFDeg <- 70.75 # EF (Mg AGB/ha)
689 +
690 +#' @export
691 +EFNFDeg_LCI <- 70.75 - 17.17032 # EF (Mg AGB/ha) 95% CI - From spreadsheet
692 +EFNFDeg_LCI <- 70.75 - 14.41080 # EF (Mg AGB/ha) 90% CI - FCPF spec
693 +
694 +#' @export
695 +EFNFDeg_UCI <- 70.75 + 17.17032 # EF (Mg AGB/ha) 95% CI - From spreadsheet
696 +EFNFDeg_UCI <- 70.75 + 14.41080 # EF (Mg AGB/ha) 90% CI - FCPF spec
697 +
698 +#' @export
699 +EFNFDeg_SD <- 8.760365 # EF (Mg AGB/ha) 90% CI - FCPF spec
700 +
701 +#' @export
702 +ErrAreaNFDeg <- 0.25 # Relative error in area, degradation in Natural
703 Forest
704 +
705 # Burning #####
706
707 @@ -68,6 +88,7 @@
708 errMAIBsw <- 0.25 # Relative error in 'maibp'(was param.errmaibp)
709
710 +
711 +
712 # 3. Enhancement of Carbon stocks #####
713

```

```

714 # Afforestation *****
715 @@ -95,6 +116,11 @@
716 #' @export
717 errMAIVar <- 0.5 # Relative error for MAI volumn inc Affor/Refor (MAIRVar)
718
719 +## MGG - patch for ARefor survey area to override Adjusted Areas sampled
720 +
721 +#' @export
722 +ErrAreaARefor <- 0.25 # Relative error in area, Afforestation survey area
723 +
724 # Forest Plantations #####
725
726 #' @export
727 Index: R/ReportTotals.R
728 =====
729 --- R/ReportTotals.R (revision 4453)
730 +++ R/ReportTotals.R (revision 4454)
731 @@ -18,8 +18,8 @@
732 #'
733 #' @return Gross Emissions - tCO2e
734 #' @export
735 -CalcGrossEm <- function (GrossEmDefor, EstEmFell, EstEmFire, GrossEmFPln) {
736 - return(GrossEmDefor + EstEmFell + EstEmFire + GrossEmFPln)
737 +CalcGrossEm <- function (GrossEmDefor, EstEmFell, EstEmFire,
738 + GrossEmFPln, EstEmNFDeg) {
739 + return(GrossEmDefor + EstEmFell + EstEmFire + GrossEmFPln + EstEmNFDeg)
740 + }
741
742 @@ -53,14 +53,16 @@
743 #' @param EstEmFell Gross emissions from logging
744 #' @param EstRemFell Gross removals from regrowth on logged areas
745 #' @param EstEmFire Gross emissions from burning
746 +#' @param EstEmNFDeg Gross emissions from degradation
747 #' @seealso [CalcEstEmFell()]
748 #' @seealso [CalcEstRemFell()]
749 #' @seealso [CalcEstEmFire()]
750 +#' @seealso [CalcEstEmNFDeg()]
751 #' @return Forest Degradation Net Emissions - tCO2e
752 #' @export
753
754 -CalcEstEmRemsFDeg <- function (EstEmFell, EstRemFell, EstEmFire) {
755 - return (EstEmFell + EstRemFell + EstEmFire)
756 +CalcEstEmRemsFDeg <- function (EstEmFell, EstRemFell, EstEmFire,
757 + EstEmNFDeg) {
758 + return (EstEmFell + EstRemFell + EstEmFire + EstEmNFDeg)
759 + }
760
761 Index: R/UC_ER_Values.R
762 =====
763 --- R/UC_ER_Values.R (revision 4453)
764 +++ R/UC_ER_Values.R (revision 4454)
765 @@ -92,7 +92,7 @@
766 # Felling Volume uncertainty not included in MC, just use actual volume

```

```

767
768   CalcEstEmFellArgs <- function() {
769 -   return(list(UC$TEF, MV$FDegFellVol))
770 +   return(list(MV$FDegFellVol, UC$TEF))
771   }
772
773
774 @@ -134,9 +134,35 @@
775   }
776
777   # Final Estimate of emissions with UCI and LCI
778 -   McEstEmFell <- CalcMonteCarlo("EstEmFell", EmRems$NetEmRemsFell,
CalcNetEmRemsFell, CalcNetEmRemsFellArgs)
779 -   if (debug_er) McEstEmFell
780 +   McNetEmRemsFell <- CalcMonteCarlo("NetEmRemsFell",
EmRems$NetEmRemsFell, CalcNetEmRemsFell, CalcNetEmRemsFellArgs)
781 +   if (debug_er) McNetEmRemsFell
782
783 +   ## Yearly Emissions from degradation in natural forest (tCO2e)
784 +   # Estimate of CO2e removals from degradation
785 +   # Uncertainty associated with the with EF NFDeg and Area degraded
786 +   # Calculate the arguments
787 +   CalcEstEmNFDegArgs <- function() {
788 +   return(list(UC_MV$NFDegArea, UC$EFNFDeg))
789 +   }
790 +
791 +   ## MGG - UC
792 +   # Final Estimate for Removals with UCI and LCI
793 +   result$McEstEmNFDeg <- CalcMonteCarlo("EstEmNFDeg", EmRems$EstEmNFDeg,
CalcEstEmNFDeg, CalcEstEmNFDegArgs)
794 +   if (debug_er) result$McEstEmNFDeg
795 +   local$EstEmNFDeg <- ValueWithUncertainty(
796 +   Value = EmRems$EstEmNFDeg,
797 +   LowerCI = result$McEstEmNFDeg$value[2],
798 +   UpperCI = result$McEstEmNFDeg$value[3],
799 +   model = create_vwuSampled(result$McEstEmNFDeg$MCresults), fixed = FALSE
800 +   )
801 +   names(local$EstEmNFDeg) <- c("EstEmNFDeg")
802 +
803 +   CalcNetEmRemsNFDegArgs <- function() {
804 +   return(list(local$EstEmNFDeg))
805 +   }
806 +
807 +   McNetEmRemsNFDeg <- CalcMonteCarlo("NetEmRemsNFDeg",
EmRems$NetEmRemsNFDeg, CalcNetEmRemsNFDeg, CalcNetEmRemsNFDegArgs)
808 +   if (debug_er) McNetEmRemsNFDeg
809   #####
810   ## 2.2 Biomass Burning
811
812 @@ -323,7 +349,7 @@
813
814   # Gross Emissions Total
815   CalcGrossEmArgs <- function() {
816 -   return(list(local$GrossEmDefor, local$EstEmFell, local$EstEmFire,
local$GrossEmFPln ))

```



```

817 + return(list(local$GrossEmDefor, local$EstEmFell, local$EstEmFire,
818 local$GrossEmFPln, local$EstEmNFDeg ))
819 }
820 ## MGG - UC
821 @@ -354,7 +380,7 @@
822
823 # Forest Degradation Total
824 CalcEstEmRemsFDegArgs <- function() {
825 - return(list(local$EstEmFell, local$EstEmFell, local$EstEmFire))
826 + return(list(local$EstEmFell, local$EstEmFell, local$EstEmFire,
827 local$EstEmNFDeg))
828 }
829 ## MGG - UC
830 Index: R/UC_MV_Values.R
831 =====
832 --- R/UC_MV_Values.R      (revision 4453)
833 +++ R/UC_MV_Values.R      (revision 4454)
834 @@ -25,11 +25,21 @@
835 )
836 names(result$DeforAreaUp) <- c("DeforAreaUp")
837
838 + ## MGG - patch for ARefor survey area to override Adjusted Areas sampled
839 + # result$AReforArea <- ValueWithUncertainty(
840 + #   Value = MV$AReforArea,
841 + #   LowerCI = quantile(MV$McAReforArea,probs=QLCI),
842 + #   UpperCI = quantile(MV$McAReforArea,probs=QUCI),
843 + #   model = create_vwuSampled(MV$McAReforArea), fixed = FALSE
844 + # )
845 + # names(result$AReforArea) <- c("AReforArea")
846 +
847 + ## MGG - patch for ARefor survey area to override Adjusted Areas sampled
848 result$AReforArea <- ValueWithUncertainty(
849   Value = MV$AReforArea,
850 - LowerCI = quantile(MV$McAReforArea,probs=QLCI),
851 - UpperCI = quantile(MV$McAReforArea,probs=QUCI),
852 - model = create_vwuSampled(MV$McAReforArea), fixed = FALSE
853 + LowerCI = MV$AReforArea - MV$AReforArea * ErrAreaARefor,
854 + UpperCI = MV$AReforArea + MV$AReforArea * ErrAreaARefor,
855 + model = vwuTriangle, fixed = FALSE
856 )
857 names(result$AReforArea) <- c("AReforArea")
858
859 @@ -41,5 +51,13 @@
860 )
861 names(result$FDegFellArea) <- c("FDegFellArea")
862
863 + result$NFDegArea <- ValueWithUncertainty(
864 +   Value = MV$NFDegArea,
865 +   LowerCI = MV$NFDegArea - MV$NFDegArea * ErrAreaNFDeg,
866 +   UpperCI = MV$NFDegArea + MV$NFDegArea * ErrAreaNFDeg,
867 +   model = vwuTriangle, fixed = FALSE
868 + )
869 + names(result$NFDegArea) <- c("NFDegArea")

```

```

870 +
871   return(result)
872 }
873 Index: R/UC_Values.R
874 =====
875 --- R/UC_Values.R    (revision 4453)
876 +++ R/UC_Values.R    (revision 4454)
877 @@ -91,6 +91,14 @@
878 )
879 names(result$MAIBsw) <- c("MAIBsw")
880
881 + result$EFNFDeg <- ValueWithUncertainty(
882 +   Value = EFNFDeg,
883 +   LowerCI = EFNFDeg_LCI,
884 +   UpperCI = EFNFDeg_UCI,
885 +   model = vwuTriangle, fixed = FALSE
886 + )
887 + names(result$EFNFDeg) <- c("EFNFDeg")
888 +
889   result$MAICFell <- ValueWithUncertainty(
890     Value = MAICFell,
891     LowerCI = MAICFell - MAICFell * ErrMAICFell,
892 Index: man/CalcEstEmNFDeg.Rd
893 =====
894 --- man/CalcEstEmNFDeg.Rd    (nonexistent)
895 +++ man/CalcEstEmNFDeg.Rd    (revision 4454)
896 @@ -0,0 +1,58 @@
897 +% Generated by roxygen2: do not edit by hand
898 +% Please edit documentation in R/Degradation.R
899 +\name{CalcEstEmNFDeg}
900 +\alias{CalcEstEmNFDeg}
901 +\title{Emissions from Degradation - Total of upland and lowland}
902 +\usage{
903 +CalcEstEmNFDeg(Area, EF, RootToShootRatio)
904 +}
905 +\arguments{
906 +\item{Area}{Area of degradation over the period}
907 +
908 +\item{EF}{Biomass conversion and expansion factor for forest degradation}
909 +
910 +\item{RootToShootRatio}{Root-to-shoot ratio for tropical forests}
911 +}
912 +\value{
913 +Emissions from Native Forest Degradation - tCO2e
914 +}
915 +\description{
916 +This function was added in Nov 2022 to incorporate work done by Eric Bullock
917 +}
918 +\details{
919 +Assessment of emissions from degradation using the
920 +reference data for activity data (area of degradation) and statistical
921 +inference using GEDI data and global biomass models for the emission
922 +factors.
923 +

```

```

924 +Date: 12/10/2022
925 +User: Eric Bullock
926 +Contact: eric.bullock@usda.gov
927 +
928 +Description: Preliminary assessment of the area of degradation, emission
929 +factors, and CO2 emissions during Fiji's reference period.
930 +
931 +Methodology
932 +Forest type map: Data from Fiji's preliminary NFI and Landsat were used to
933 +create a landcover and forest type map for 2006. The NFI data was used to
934 +train a Random Forest classifier using Landsat metrics as predictors.
935 +Classification was performed on Google Earth Engine.
936 +
937 +Activity data: Areas and standard errors were calculated using a the same
938 +reference sample derived used for reporting emissions from deforestation. A
939 +new class 'degradation' was defined as reference sample units that
940 +converted
941 +from closed to open forest. Inference of the area and standard errors was
942 +performed using an unbiased ratio estimator that accounts for differences
943 +between the classes in a stratification and the reference label (Stehman,
944 +2014).
945 +
946 +Emission factors: Aboveground biomass density was calculated for open and
947 +closed forests using the forest type map for defining the populations.
948 +Lidar
949 +data from GEDI was used with global biomass models and hybrid statistical
950 +inference to calculate mean aboveground biomass and uncertainty (Patterson
951 +et al., 2019). Biomass density was converted to carbon and CO2e, and the
952 +difference between classes defined the emission factor.
953 +}
954 +\references{
955 +\link{TBC}
956 +}
957
958 Property changes on: man/CalcEstEmNFDeg.Rd
959
960 Added: svn:eol-style
961 ## -0,0 +1 ##
962 +native
963 \ No newline at end of property
964 Index: man/CalcEstEmRemsFDeg.Rd
965
966 =====
967 --- man/CalcEstEmRemsFDeg.Rd      (revision 4453)
968 +++ man/CalcEstEmRemsFDeg.Rd      (revision 4454)
969 @@ -4,7 +4,7 @@
970 \alias{CalcEstEmRemsFDeg}
971 \title{Forest Degradation Net Emissions}
972 \usage{
973 -CalcEstEmRemsFDeg(EstEmFell, EstRemFell, EstEmFire)
974 +CalcEstEmRemsFDeg(EstEmFell, EstRemFell, EstEmFire, EstEmNFDeg)
975 }
976 \arguments{
977 \item{EstEmFell}{Gross emissions from logging}
978 @@ -12,6 +12,8 @@
979 \item{EstRemFell}{Gross removals from regrowth on logged areas}

```

```

977
978 \item{EstEmFire}{Gross emissions from burning}
979 +
980 +\item{EstEmNFDeg}{Gross emissions from degradation}
981 }
982 \value{
983 Forest Degradation Net Emissions - tCO2e
984 @@ -29,4 +31,6 @@
985 \code{\link[=CalcEstRemFell]{CalcEstRemFell()}}
986
987 \code{\link[=CalcEstEmFire]{CalcEstEmFire()}}
988 +
989 +\code{\link[=CalcEstEmNFDeg]{CalcEstEmNFDeg()}}
990 }
991 Index: man/CalcGrossEm.Rd
992 =====
993 --- man/CalcGrossEm.Rd (revision 4453)
994 +++ man/CalcGrossEm.Rd (revision 4454)
995 @@ -4,7 +4,7 @@
996 \alias{CalcGrossEm}
997 \title{Gross Emissions}
998 \usage{
999 -CalcGrossEm(GrossEmDefor, EstEmFell, EstEmFire, GrossEmFPln)
1000 +CalcGrossEm(GrossEmDefor, EstEmFell, EstEmFire, GrossEmFPln, EstEmNFDeg)
1001 }
1002 \arguments{
1003 \item{GrossEmDefor}{Gross emissions from deforestation}
1004 Index: man/CalcNetEmRemsNFDeg.Rd
1005 =====
1006 --- man/CalcNetEmRemsNFDeg.Rd (nonexistent)
1007 +++ man/CalcNetEmRemsNFDeg.Rd (revision 4454)
1008 @@ -0,0 +1,24 @@
1009 +% Generated by roxygen2: do not edit by hand
1010 +% Please edit documentation in R/Degradation.R
1011 +\name{CalcNetEmRemsNFDeg}
1012 +\alias{CalcNetEmRemsNFDeg}
1013 +\title{Net emissions from Degradation of Natural Forests (tCO2e)}
1014 +\usage{
1015 +CalcNetEmRemsNFDeg(EstEmNFDeg)
1016 +}
1017 +\arguments{
1018 +\item{EstEmNFDeg}{Emissions from degradation}
1019 +}
1020 +\value{
1021 +Emissions from degradation of Natural Forests - tCO2e
1022 +}
1023 +\description{
1024 +This function used functions CalcEstEmNFDeg to calculate net
1025 +emissions from degradation Emissions are presented in tCO2e.
1026 +}
1027 +\references{
1028 +\link{TBC - ERPD citation}
1029 +}
1030 +\seealso{
1031 +\code{\link[=CalcEstEmNFDeg]{CalcEstEmNFDeg()}}

```

```

1032 +}
1033
1034 Property changes on: man/CalcNetEmRemsNFDeg.Rd
1035
1036 Added: svn:eol-style
1037 ## -0,0 +1 ##
1038 +native
1039 \ No newline at end of property
1040 Index: DESCRIPTION
1041 =====
1042 --- DESCRIPTION (revision 4453)
1043 +++ DESCRIPTION (revision 4454)
1044 @@ -1,6 +1,6 @@
1045 Package: FijiNFMSCalculations
1046 Title: Fiji NFMS Calculations
1047 -Version: 1.0.3
1048 +Version: 1.0.4
1049 Authors@R:
1050     person(given = "Michael",
1051           family = "Green",
1052 Index: NAMESPACE
1053 =====
1054 --- NAMESPACE (revision 4453)
1055 +++ NAMESPACE (revision 4454)
1056 @@ -15,6 +15,7 @@
1057 export(CalcEstEmFPInSwd)
1058 export(CalcEstEmFell)
1059 export(CalcEstEmFire)
1060 +export(CalcEstEmNFDeg)
1061 export(CalcEstEmRemsEnh)
1062 export(CalcEstEmRemsFDeg)
1063 export(CalcEstRemARefor)
1064 @@ -41,6 +42,7 @@
1065 export(CalcNetEmRems)
1066 export(CalcNetEmRemsFPIn)
1067 export(CalcNetEmRemsFell)
1068 +export(CalcNetEmRemsNFDeg)
1069 export(CarbonToCO2eConv)
1070 export(CombustFactor)
1071 export(ConvBiomassToCO2e)
1072 @@ -59,7 +61,13 @@
1073 export(EFFelling)
1074 export(EFInfrastructure)
1075 export(EFN20)
1076 +export(EFNFDeg)
1077 +export(EFNFDeg_LCI)
1078 +export(EFNFDeg_SD)
1079 +export(EFNFDeg_UCI)
1080 +export(ErrAreaARefor)
1081 export(ErrAreaFell)
1082 +export(ErrAreaNFDeg)
1083 export(ErrMAICFell)
1084 export(GWPCH4)
1085 export(GWPCO2)
1086 @@ -90,6 +98,7 @@

```

```
1087     export(calcFRLFelling)
1088     export(calcFRLFuelwood)
1089     export(calcFRLHardwoodPlantations)
1090 +export(calcFRLNaturalForestDegradation)
1091     export(calcFRLNet)
1092     export(calcFRLPlantations)
1093     export(calcFRLSoftwoodPlantations)
1094
```