# Appendix A: Hydrologic Data Development System Coding

**Arc Macro Language Files**

/*
1.     /* Name: **addlu.aml**
2.     /*---------------------
3.     /* Purpose: Accesses land use / RCN table for addition of land use codes and runoff curve numbers
4.     /*---------------------
5.     /* Calls: None
6.     /*---------------------
7.     /* Called by: lu_rcn.men
8.     /*---------------------
9.     /* Required variables:
10.    /*---------------------
11.    /* Global variables set: None
12.    /*---------------------
13.    /* Data created: adds records to  rcns.dat
14.    /*---------------------
15.    /* Creation Information
16.    /* Author: Peter N. Smith, P.E.
17.    /* Original coding date: 3/31/95
18.    /* Last update: 5/8/95
19.    /*---------------------
20.    /* Remarks:
21.    /*---------------------
22.    /*
23.    &data arc tables
24.    select rcns.dat
25.    add
26.    &end
27.    &return


1.     /* Name: **chk.aml**
2.     /*---------------------
3.     /* Purpose: This checks that the user has already selected a data set
4.     /* prior to other operations
5.     /*---------------------
6.     /* Calls: None
7.     /*---------------------
8.     /* Called by: basins.men
9.     /*---------------------
10.    /* Required variables: .PTH .PTH2 .basn
11.    /*---------------------
12.    /* Global variables set: None
13.    /*---------------------
14.    /* Data created: None
15.    /*---------------------
16.    /* Creation Information
17.    /* Author: Peter N. Smith, P.E.
18.    /* Original coding date: 05/08/95
19.    /* Last update:
20.    /*---------------------
21.    /* Remarks:
22.    /*---------------------
23.    /*
24.    &if [null %.basn%] &then &do
25.    &type You must select your data set first.
26.    &type If your desired data set does not appear, simply choose any set

27. &type then select Data/setpath and establish the correct path.
28. &run %.pth%infiles.aml
29. &end
30. &return

1. /* Name: **cleanup.aml**
2. /*----------------------
3. /* Purpose: This AML removes all working (no permanent) data that has been created during
4. /* HDDS sessions for the current basin prefix and suffix. The user may change the
5. /* current suffix here, but must change the prefix by selecting Data/Existing prior to
6. /* initiation of Cleanup
7. /*----------------------
8. /* Calls: None
9. /*----------------------
10. /* Called by: basins.menu
11. /*----------------------
12. /* Required variables: .PTH .PTH2 .basn .suff
13. /*----------------------
14. /* Global variables set: None
15. /*----------------------
16. /* Data created: None
17. /*----------------------
18. /* Creation Information
19. /* Author: Peter N. Smith, P.E.
20. /* Original coding date: 01/30/95
21. /* Last update: 4/18/95
22. /*----------------------
23. /* Remarks:
24. /*----------------------
25. /*
26. setmask off
27. &popup %.PTH%clnup.txt
28. /* list coverages and grids
29. listgrids
30. listcoverages
31. /* Show current file set suffix
32. &type The current suffix is %.suff%
33. /* Allow user to modify suffix
34. &sv q = [response 'Do you wish to change this? (Yor N)']
35. &if %q% = Y or %q% = y &then &do
36.         &sv .suff = [response 'Enter the suffix for the files to delete']
37.         &end
38. &messages &on
39. &sv rid = [response 'Do you wish to erase these files? (YES, or n)']
40. &if %rid% = YES &THEN &do
41. &if [exists %.basn%pp%.suff% -grid] &THEN
42. kill %.basn%pp%.suff% all
43. &if [exists %.basn%da%.suff% -grid] &THEN
44. kill %.basn%da%.suff% all
45. &if [exists %.basn%shed%.suff% -grid] &THEN
46. kill %.basn%shed%.suff% all
47. &if [exists %.basn%tmp%.suff% -cover] &THEN
48. kill %.basn%tmp%.suff% all
49. &if [exists %.basn%up%.suff% -grid] &THEN
50. kill %.basn%up%.suff% all
51. &if [exists %.basn%dn%.suff% -grid] &THEN
52. kill %.basn%dn%.suff% all
53. &if [exists %.basn%tc%.suff% -grid] &THEN
54. kill %.basn%tc%.suff% all
55. &if [exists %.basn%tup%.suff% -grid] &then

56.     kill %.basn%tup%.suff% all
57.     &if [exists %.basn%tdn%.suff% -grid] &THEN
58.     kill %.basn%tdn%.suff% all
59.     &if [exists %.basn%l%.suff% -grid] &THEN
60.     kill %.basn%l%.suff% all
61.     &if [exists %.basn%ptharc%.suff% -cover] &THEN
62.     kill %.basn%ptharc%.suff% all
63.     &if [exists %.basn%pth%.suff% -grid] &THEN
64.     kill %.basn%pth%.suff% all
65.     &if [exists %.basn%tptharc%.suff% -cover] &THEN
66.     kill %.basn%tptharc%.suff% all
67.     &if [exists %.basn%tpth%.suff% -grid] &THEN
68.     kill %.basn%tpth%.suff% all
69.     &if [exists %.basn%rd%.suff% -cover] &then
70.     kill %.basn%rd%.suff% all
71.     &if [exists %.basn%strm%.suff% -cover] &then
72.     kill %.basn%strm%.suff% all
73.     &if [exists %.basn%cty%.suff% -cover] &then
74.     kill %.basn%cty%.suff% all
75.     &if [exists %.basn%cnty%.suff% -cover] &then
76.         kill %.basn%cnty%.suff% all
77.         &if [exists xcell%.suff% -grid] &then
78.         kill xcell%.suff% all
79.         &if [exists ycell%.suff% -grid] &then
80.         kill ycell%.suff% all
81.         &if [exists %.basn%seg%.suff% -grid] &then
82.         kill %.basn%seg%.suff% all
83.         &if [exists %.basn%acc%.suff% -grid] &then
84.         kill %.basn%acc%.suff% all
85.         &if [exists %.basn%sshed%.suff% -grid] &then
86.         kill %.basn%sshed%.suff% all
87.         &if [exists %.basn%spp%.suff% -grid] &then
88.         kill %.basn%spp%.suff% all
89.         if [exists cuma%.suff% -grid] &then
90.         kill cuma%.suff% all
91.         &if [exists suba%.suff% -grid] &then
92.         kill suba%.suff% all
93.         &if [exists %.basn%suba%.suff% -grid] &then
94.         kill %.basn%suba%.suff% all
95.         &if [exists subaply%.suff% -cover] &then
96.         kill subaply%.suff% all
97.         &if [exists subapnt%.suff% -cover] &then
98.         kill subapnt%.suff% all
99.         &if [exists cumapnt%.suff% -cover] &then
100.         kill cumapnt%.suff% all
101.         &if [exists %.basn%sub%.suff% -cover] &then
102.         kill %.basn%sub%.suff% all
103.         &if [exists %.basn%da%.suff% -cover] &then
104.         &if [exists %.basn%tcwt%.suff% -grid] &then
105.         kill %.basn%tcwt%.suff% all
106.         &if [exists %.basn%wtrain%.suff% -grid] &then
107.         kill %.basn%wtrain%.suff% all
108.         &if [exists %.basn%soil%.suff% -cover] &then
109.         kill %.basn%soil%.suff% all
110.         &if [exists %.basn%hydgrp%.suff% -cover] &then
111.         kill %.basn%hydgrp%.suff% all
112.         &if [exists %.basn%aspct%.suff% -grid] &then
113.         kill %.basn%aspct%.suff% all
114.         &if [exists %.basn%gage%.suff% -grid] &then
115.         kill %.basn%gage%.suff% all

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116.    &if [exists %.basn%qds%.suff% -cover] &then
117.    kill %.basn%qds%.suff% all
118.    &if [exists %.basn%subas%.suff% -grid] &then
119.    kill %.basn%subas%.suff% all
120.    &if [exists %.basn%stc%.suff% -grid] &then
121.    kill %.basn%stc%.suff% all
122.    &if [exists %.basn%spth%.suff% -grid] &then
123.    kill %.basn%spth%.suff% all
124.    &if [exists %.basn%stpth%.suff% -grid] &then
125.    kill %.basn%stpth%.suff% all
126.    &if [exists %.basn%stptharc%.suff% -cover] &then
127.    kill %.basn%stptharc%.suff% all
128.    &if [exists %.basn%sup%.suff% -grid] &then
129.    kill %.basn%sup%.suff% all
130.    &if [exists %.basn%sdn%.suff% -grid] &then
131.    kill %.basn%sdn%.suff% all
132.    &if [exists %.basn%stdn%.suff% -grid] &then
133.    kill %.basn%stup%.suff% all
134.    &if [exists %.basn%stdn%.suff% -grid] &then
135.    kill %.basn%stdn%.suff% all
136.    &if [exists %.basn%adj%.suff% -grid] &then
137.    kill %.basn%adj%.suff% all
138.    &if [exists %.basn%dir%.suff% -grid] &then
139.    kill %.basn%dir%.suff% all
140.    &if [exists %.basn%hydgrp%.suff% -cover] &then
141.    kill %.basn%hydgrp%.suff% all
142.    &if [exists %.basn%gage%.suff% -cover] &then
143.    kill %.basn%gage%.suff% all
144.    &if [exists %.basn%soil%.suff% -cover] &then
145.    kill %.basn%soil%.suff% all
146.    &if [exists %.basn%lugrd%.suff% -grid] &then
147.    kill %.basn%lugrd%.suff% all
148.    &if [exists %.basn%slgrd%.suff% -grid] &then
149.    kill %.basn%slgrd%.suff% all
150.    &if [exists %.basn%wtrcn%.suff% -grid] &then
151.    kill %.basn%wtrcn%.suff% all
152.    &if [exists %.basn%l85%.suff% -grid] &then
153.    kill %.basn%l85%.suff% all
154.    &if [exists e85%.suff% -grid] &then
155.    kill e85%.suff% all
156.    &if [exists %.basn%l10%.suff% -grid] &then
157.    kill %.basn%l10%.suff% all
158.    &if [exists e10%.suff% -grid] &then
159.    kill e10%.suff% all
160.    &if [exists %.basn%strng%.suff% -grid] &then
161.    kill %.basn%strng%.suff% all
162.    &if [exists %.basn%rgn%.suff% -cover] &then
163.    kill %.basn%rgn%.suff% all
164.    &if [exists %.basn%gages%.suff% -grid] &then
165.    kill %.basn%gages%.suff% all
166.    &if [exists %.basn%lunew%.suff% -grid] &then
167.    kill %.basn%lunew%.suff% all
168.    &if [exists h -grid] &then
169.    kill h all
170.    &if [exists k -grid] &then
171.    kill k all
172.    &if [exists l -grid] &then
173.    kill l all
174.    &if [exists *.s] &then
175.    &sys rm *.s
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176.      &if [exists *.x] &then
177.          &sys rm *.x
178.      &if [exists %.basn%tinv%.suff% -grid] &then kill %.basn%tinv%.suff% all
179.      &if [exists %.basn%tadd%.suff% -grid] &then kill %.basn%tadd%.suff% all
180.      &if [exists %.basn%tadd2%.suff% -grid] &then kill %.basn%tadd2%.suff% all
181.      &if [exists %.basn%smx%.suff% -grid] &then kill %.basn%smx%.suff% all
182.      &if [exists %.basn%spth%.suff% -grid] &then kill %.basn%spth%.suff% all
183.      &if [exists %.basn%stc%.suff% -cover] &then kill %.basn%stc%.suff% all
184.      &if [exists %.basn%tctmp%.suff% -grid] &then kill %.basn%tctmp%.suff% all
185.      &if [exists %.basn%vel%.suff% -grid] &then kill %.basn%vel%.suff% all
186.      &if [exists clippoly -cover] &then kill clippoly all
187.      &if [exists %.basn%rcn%.suff% -cover] &then kill %.basn%rcn%.suff% all
188.      &if [exists %.basn%r%.suff% -cover] &then kill %.basn%r%.suff% all
189.          &popup %.PTH%clnend.txt
190. &end
191. &return


1.    /* Name: drawcov.aml
2.    /*----------------------
3.    /* Purpose: Draws coverage as select by user in askdraw.men
4.    /*----------------------
5.    /* Calls: None
6.    /*----------------------
7.    /* Called by: basins.men
8.    /*----------------------
9.    /* Required variables: %.type% %.covt% %.comm% %.item%
10.   /*----------------------
11.   /* Global variables set: .cov
12.   /*----------------------
13.   /* Creation Information
14.   /* Author: Peter N. Smith, P.E.
15.   /* Original coding date: 12/01/94
16.   /* Last update: 5/1/95
17.   /*----------------------
18.   /* Remarks: The draw cover type is %.cov%, the draw command is %.comm% both of
19.   /* which are set in askdraw.men
20.   /*----------------------
21.   &if [null %.type%] &then
22.          &return
23.   &sv .cov = [GET%.type% * %.covt% -OTHER]
24.   &sv q = [response 'Do you want the map extent set to the selected coverage? (Y/N)']
25.   &if %q% = y or %q% = Y &then
26.          mape %.cov%
27.   &if not [null %.covt%] &then &do
28.          &if %.covt% = -POLY &then &do
29.                   &sv .item [getitem %.cov% -poly]
30.                   %.comm% %.cov% %.item%
31.          &end
32.          &else
33.                   %.comm% %.cov%
34.   &end
35.   &else
36.          %.comm% %.cov%
37.   &return


1.    /* Name: drwgge.aml
2.    /*----------------------
3.    /* Purpose: This aml draws the grid of newly moved gages
4.    /*
5.    /*----------------------
```

6.    /* Calls: None
7.    /*---------------------
8.    /* Called by: **gage.men**
9.    /*---------------------
10.   /* Required variables: .PTH .PTH2 .basn .suff
11.   /*---------------------
12.   /* Global variables set: None
13.   /*---------------------
14.   /* Data created: None
15.   /*---------------------
16.   /* Creation Information
17.   /* Author: Peter N. Smith, P.E.
18.   /* Original coding date: 4/01/94
19.   /* Last update:
20.   /*---------------------
21.   /* Remarks:
22.   /*
23.   /*---------------------
24.   &if [exists %.basn%gages%.suff% -grid] &then gridpaint %.basn%gages%.suff%
25.   &else &type You need to select and move gages first
26.   &return

1.    /* Name: **dsgnrain.aml**
2.    /*---------------------
3.    /* Purpose: This aml uses the delineated watershed or subareas to determine
4.    /* weighted rainfall amount(s) using TP40 design values for 24 hour storms.
5.    /*
6.    /*---------------------
7.    /* Calls: None
8.    /*---------------------
9.    /* Called by: basins.menu
10.   /*---------------------
11.   /* Required variables: .PTH .PTH2 .basn .suff
12.   /*---------------------
13.   /* Global variables set:
14.   /*---------------------
15.   /* Data created:
16.   /*---------------------
17.   /* Creation Information
18.   /* Author: Peter N. Smith, P.E.
19.   /* Original coding date: 2/03/95
20.   /* Last update: 5/08/95
21.   /*---------------------
22.   /* Remarks: Adds weighted rainfall to watershed PAT of subareas PAT
23.   /*
24.   /*---------------------
25.   &if [exists %.basn%wtr2%.suff% -grid] &then kill %.basn%wtr2%.suff% all
26.   &if [exists %.basn%wtr5%.suff% -grid] &then kill %.basn%wtr5%.suff% all
27.   &if [exists %.basn%wtr10%.suff% -grid] &then kill %.basn%wtr10%.suff% all
28.   &if [exists %.basn%wtr25%.suff% -grid] &then kill %.basn%wtr25%.suff% all
29.   &if [exists %.basn%wtr50%.suff% -grid] &then kill %.basn%wtr50%.suff% all
30.   &if [exists %.basn%wtr100%.suff% -grid] &then kill %.basn%wtr100%.suff% all
31.   &if [exists %.basn%r%.suff% -cover] &then kill %.basn%r%.suff% all
32.   &if [exists %.basn%shed%.suff% -grid] &then &do
33.   &if [exists %.basn%sshed%.suff% -grid] &then &do
34.   &sv q = [getchoice Watershed Subareas -prompt 'Select breakdown of RCN']
35.   &if %q% = Watershed &then
36.   &sv use = %.basn%shed%.suff%
37.   /* Note it is best to use %.basn%pth%.suff% to minimize data size
38.   &if %q% = Subareas &then

39. &sv use = %.basn%sshed%.suff%
40. &end
41. &else &do
42. &sv use = %.basn%shed%.suff%
43. &sv q = Watershed
44. &end
45. &if [exists %.basn%pth%.suff% -grid] &then &do
46. setwindow %.basn%pth%.suff%
47. &describe %.basn%pth%.suff%
48. &end
49. &else &do
50. &sv .mask %.basn%shed%.suff%
51. &run %.PTH%winset
52. &describe %.basn%shed%.suff%
53. &end
54. setmask off
55. &type Determining Weighted rainfall amount(s) based on TP 40
56. /* Note adding value of %use% here to ensure uniqueness for subareas. (superfluous for watershed only)
57. %.basn%wtR2%.suff% = int (zonalmean (%use%, %.PTH2%tx/raingrd.f2_24) * 254000 + %use%)
58. &describe %.basn%wtR2%.suff%
59. /* Note: TP 40 values in inches, converted to mm
60. &sv .R2_24 = %GRD$ZMAX% / 10000
61. &sv .V2 = [calc %.R2_24% * %.AREA% * 1000] / 10000
62. %.basn%wtR5%.suff% = int (zonalmean (%use%, %.PTH2%tx/raingrd.f5_24) * 254000 + %use%)
63. &describe %.basn%wtR5%.suff%
64. &sv .R5_24 = %GRD$ZMAX% / 10000
65. &sv .V5 = [calc %.R5_24% * %.AREA% * 1000] / 10000
66. %.basn%wtR10%.suff% = int (zonalmean (%use%, %.PTH2%tx/raingrd.f10_24) * 254000 + %use%)
67. &describe %.basn%wtR10%.suff%
68. &sv .R10_24 = %GRD$ZMAX% / 10000
69. &sv .V10 = [calc %.R10_24% * %.AREA% * 1000] / 10000
70. %.basn%wtR25%.suff% = int (zonalmean (%use%, %.PTH2%tx/raingrd.f25_24) * 254000 + %use%)
71. &describe %.basn%wtR25%.suff%
72. &sv .R25_24 = %GRD$ZMAX% / 10000
73. &sv .V25 = [calc %.R25_24% * %.AREA% * 1000] / 10000
74. %.basn%wtR50%.suff% = int (zonalmean (%use%, %.PTH2%tx/raingrd.f50_24) * 254000 + %use%)
75. &describe %.basn%wtR50%.suff%
76. &sv .R50_24 = %GRD$ZMAX% / 10000
77. &sv .V50 = [calc %.R50_24% * %.AREA% * 1000] / 10000
78. %.basn%wtR100%.suff% = int (zonalmean (%use%, %.PTH2%tx/raingrd.f100_24) * 254000 + %use%)
79. &describe %.basn%wtR100%.suff%
80. &sv .R100_24 = %GRD$ZMAX% / 10000
81. &sv .V100 = [calc %.R100_24% * %.AREA% * 1000] / 10000
82. &label s1
83. &if %use% = %.basn%shed%.suff% &then &do
84. /* need to change this to write as file - possibly modify slect.aml
85. &type The following weighted TP 40 rainfall values have been established:
86. &type Freq.        Rain (mm)   Volume (cum)
87. &type 2            %.R2_24%                    %.V2%
88. &type 5            %.R5_24%                    %.V5%
89. &type 10           %.R10_24%                   %.V10%
90. &type 25           %.R25_24%                   %.V25%
91. &type 50           %.R50_24%                   %.V50%
92. &type 100          %.R100_24%                  %.V100%
93. &type
94. &data arc tables
95. additem %.basn%tmp%.suff%.pat R2_24 6 6 n 0
96. additem %.basn%tmp%.suff%.pat R5_24 6 6 n 0
97. additem %.basn%tmp%.suff%.pat R10_24 6 6 n 0
98. additem %.basn%tmp%.suff%.pat R25_24 6 6 n 0

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99.   additem %.basn%tmp%.suff%.pat R50_24 6 6 n 0
100.  additem %.basn%tmp%.suff%.pat R100_24 6 6 n 0
101.  select %.basn%tmp%.suff%.pat
102.  calc R2_24 = [round %.R2_24%]
103.  calc R5_24 = [round %.R5_24%]
104.  calc R10_24 = [round %.R10_24%]
105.  calc R25_24 = [round %.R25_24%]
106.  calc R50_24 = [round %.R50_24%]
107.  calc R100_24 = [round %.R100_24%]
108.  quit
109.  &end
110.  &end
111.  &else &do
112.  %.basn%r%.suff% = gridpoly (%.basn%wtr2%.suff%)
113.  &data arc tables
114.  select %.basn%wtr2%.suff%.vat
115.  alter value
116.  R2_24
117.
118.
119.
120.  select %.basn%wtr5%.suff%.vat
121.  alter value
122.  R5_24
123.
124.
125.
126.  select %.basn%wtr10%.suff%.vat
127.  alter value
128.  R10_24
129.
130.
131.
132.  select %.basn%wtr25%.suff%.vat
133.  alter value
134.  R25_24
135.
136.
137.
138.  select %.basn%wtr50%.suff%.vat
139.  alter value
140.  R50_24
141.
142.
143.
144.  select %.basn%wtr100%.suff%.vat
145.  alter value
146.  R100_24
147.
148.
149.
150.  select %.basn%r%.suff%.pat
151.  alter grid-code
152.  r2_24
153.
154.
155.
156.  quit
157.  &end
158.  &sys arc joinitem %.basn%wtr2%.suff%.vat %.BASN%wtr100%.SUFF%.vat %.basn%wtr2%.suff%.vat $recno r2_24
```

159. &sys arc joinitem %.basn%wtr2%.suff%.vat %.BASN%wtr50%.SUFF%.vat %.basn%wtr2%.suff%.vat $recno r2_24
160. &sys arc joinitem %.basn%wtr2%.suff%.vat %.BASN%wtr25%.SUFF%.vat %.basn%wtr2%.suff%.vat $recno r2_24
161. &sys arc joinitem %.basn%wtr2%.suff%.vat %.BASN%wtr10%.SUFF%.vat %.basn%wtr2%.suff%.vat $recno r2_24
162. &sys arc joinitem %.basn%wtr2%.suff%.vat %.BASN%wtr5%.SUFF%.vat %.basn%wtr2%.suff%.vat $recno r2_24
163. &sys arc joinitem %.basn%r%.suff%.pat %.BASN%wtr2%.SUFF%.vat %.basn%r%.suff%.pat r2_24 r2_24
164. /* append to %.basn%sub%.suff%n
165. &sys arc joinitem %.basn%sub%.suff%.pat %.basn%r%.suff%.pat %.basn%sub%.suff%.pat $recno WSHEDA(SQ.KM)
166. calc %.basn%sub%.suff%.pat info r100_24 = r100_24 / 10000
167. calc %.basn%sub%.suff%.pat info r50_24 = r50_24 / 10000
168. calc %.basn%sub%.suff%.pat info r25_24 = r25_24 / 10000
169. calc %.basn%sub%.suff%.pat info r10_24 = r10_24 / 10000
170. calc %.basn%sub%.suff%.pat info r5_24 = r5_24 / 10000
171. calc %.basn%sub%.suff%.pat info r2_24 = r2_24 / 10000
172. &end
173. &if [exists %.basn%wtr2%.suff% -grid] &then kill %.basn%wtr2%.suff% all
174. &if [exists %.basn%wtr5%.suff% -grid] &then kill %.basn%wtr5%.suff% all
175. &if [exists %.basn%wtr10%.suff% -grid] &then kill %.basn%wtr10%.suff% all
176. &if [exists %.basn%wtr25%.suff% -grid] &then kill %.basn%wtr25%.suff% all
177. &if [exists %.basn%wtr50%.suff% -grid] &then kill %.basn%wtr50%.suff% all
178. &if [exists %.basn%wtr100%.suff% -grid] &then kill %.basn%wtr100%.suff% all
179. &if %q% = Watershed &then list %.basn%tmp%.suff%.pat
180. &if %q% = Subareas &then list %.basn%sub%.suff%.pat
181. &end
182. &else &do
183. &popup %.pth%noshed.txt
184. &end
185. &type Done
186. &return


1.  /* Name: **fndquad.aml**
2.  /*---------------------
3.  /* Purpose: This AML identifies which dem quadrangles are needed
4.  /* for delineation of areas at 1:250k or 1:24k scales for Texas.
5.  /*
6.  /*---------------------
7.  /* Calls: slect.aml
8.  /*---------------------
9.  /* Called by: basins.menu
10. /*---------------------
11. /* Required variables: .PTH .PTH2 .basn .suff
12. /*---------------------
13. /* Global variables set: .scale .count .cover .item .subject .nos .upsc
14. /*---------------------
15. /* Data created: %.basn%qds%.suff% %.cover%.qd
16. /*---------------------
17. /* Creation Information
18. /* Author: Peter N. Smith, P.E.
19. /* Original coding date: 2/03/95
20. /* Last update: 4/18/95
21. /*---------------------
22. /* Remarks: An ASCII output of quadrangle names is created. This may
23. /* contain duplicate names which must be deleted if used for subsequent
24. /* data set up in prerpoc.aml. DEM files must have the exact name as
25. /* contained in this file.
26. /*
27. /*---------------------
28. setmask off
29. &if [exists %.basn%tmp%.suff% -cover] &then &do
30.     &if [exists %.basn%qds%.suff% -cover] &then
31.     kill %.basn%qds%.suff% all

```
32.        &sv .scale = [getchoice 1:250K 1:24K -prompt 'At which scale do you wish to work?']
33.        &if %.scale% = 1:250K &then &do
34.                &sys arc clip %.PTH2%tx/tx250ndx %.basn%tmp%.suff% %.basn%qds%.suff%
35.                &end
36.        &if %.scale% = 1:24K &then &do
37.                &sys arc clip %.PTH2%tx/tx24ndx %.basn%tmp%.suff% %.basn%qds%.suff%
38.                &end
39.        &describe %.basn%qds%.suff%
40.        &sv .count = [calc %DSC$POLYGONS% - 1]
41.        &sv .cover = %.basn%qds%.suff%
42.        &sv .item = quad_name
43.        &sv .subject = quad_names
44.        &sv .nos = 0
45.        &run %.PTH%slect.aml
46.        &sv .upsc = Y
47.        &sys mv %.cover%.dat %.cover%.qd
48.        &popup %.PTH%preproc.txt
49.        &popup %.cover%.qd
50.        &end
51.   &else
52.        &type %.basn%shed%.suff% does not exist. You need to run watershed first.
53.   &return


1.    /* Name: hdds.aml
2.    /*---------------------
3.    /* Purpose: This invokes the project menu for the Hydologic Data Development System
4.    /* Global variables are initialized which include paths for permanent data.
5.    /* System environment is also established.
6.    /*---------------------
7.    /* Calls: basins.men
8.    /*---------------------
9.    /* Called by: &run [path]/basmenu from ARC prompt
10.   /*---------------------
11.   /* Required variables: None
12.   /*---------------------
13.   /* Global variables set: .PTH .PTH2 .scale .suff .upsc .basn .nopps .outfall .rdid .strmid
14.   /*---------------------
15.   /* Creation Information
16.   /* Author: Peter N. Smith, P.E.
17.   /* Original coding date: 12/01/94
18.   /* Last update: 3/30/95
19.   /*---------------------
20.   /* Remarks:
21.   /* 1. On installation, the variable .PTH2 should be preset to reflect
22.   /* the directories in which the amls and data reside.
23.   /* 2. The routine may be run from any workspace at the ARC prompt.
24.   /*---------------------
25.   &station 9999
26.   /* The user needs only to change the following line on installation
27.   &sv .PTH2 = /usr2/psmith/thesis/
28.   /* establish path to amls
29.   &amlpath %.pth2%amls
30.   /* Initialize global variables
31.   /* path to amls, menus, and messages
32.   &sv .PTH = %.pth2%amls/
33.   &sv .scale =
34.   &sv .suff =
35.   &sv .upsc =
36.   &sv .basn
37.   &sv .outfall = n
```

38.  &sv .nopps = 1
39.  &sv .work =
40.  &sv .rdid
41.  &sv .strmid
42.  &sv .lucode
43.  GRID
44.  &popup %.PTH%strt.txt
45.  &menu %.PTH%basins.men &position &UC &stripe ~
46.  'Hydrologic Data Development System'
47.  &return

1.  /* Name: **hddscd.aml**
2.  /*---------------------
3.  /* Purpose: This invokes the cdrom version project menu for the Hydologic Data
4.  /* Development System.
5.  /* Global variables are initialized which include paths for permanent data.
6.  /* System environment is also established.
7.  /*---------------------
8.  /* Calls: basins.men
9.  /*---------------------
10. /* Called by: &run [path]/hdds from ARC prompt
11. /*---------------------
12. /* Required variables: None
13. /*---------------------
14. /* Global variables set: .PTH .PTH2 .scale .suff .upsc .basn .rdis .strmid .work
15. /* .outfall .nopps
16. /*---------------------
17. /* Creation Information
18. /* Author: Peter N. Smith, P.E.
19. /* Original coding date: 12/01/94
20. /* Last update: 4/18/95
21. /*---------------------
22. /* Remarks:
23. /* 1. On installation, the variables .PTH and .PTH2 and amlpath should be
24. /* preset to reflect the directories in which the amls and data reside.
25. /* 2. The routine may be run from any workspace at the ARC prompt.
26. /*---------------------
27. &station 9999
28. /* establish path to amls
29. &amlpath /cdrom/thesis/amls
30. /* Initialize global variables
31. &sv .PTH = /cdrom/thesis/amls/
32. &sv .PTH2 = /cdrom/thesis/
33. &sv .scale =
34. &sv .suff =
35. &sv .upsc =
36. &sv .basn
37. &sv .outfall = n
38. &sv .nopps = 1
39. &sv .work
40. &sv .rdid
41. &sv .strmid
42. &sv .lucode
43. GRID
44. &popup %.PTH%strt.txt
45. &menu %.PTH%basins.men &position &UC &stripe ~
46. 'Hydrologic Data Development System'
47. &return

1.  /* Name: **idroad.aml**

2. /*---------------------
3. /* Purpose: Request user to select a stretch of road that will be used in conjunction
4. /* with an identified stream to locate a watershed outfall.
5. /*
6. /*---------------------
7. /* Calls: None
8. /*---------------------
9. /* Called by: basins.menu
10. /*---------------------
11. /* Required variables: .PTH .PTH2 .basn
12. /*
13. /*---------------------
14. /* Global variables set: .rdid
15. /*---------------------
16. /* Creation Information
17. /* Author: Peter N. Smith, P.E.
18. /* Original coding date: 12/02/94
19. /* Last update: 3/30/95
20. /*---------------------
21. /* Remarks:
22. /*
23. /*---------------------
24. LINECOLOR 2
25. &type 'Please select a road.'
26. &severity &error &routine redo
27. /* User identify road with mouse
28. RESELECT %.PTH2%%.basn%/%.basn%rds ARCS ONE *
29. &messages &off
30. /* save id of selected arc (road stretch)
31. &sv .rdid = [SHOW SELECT %.PTH2%%.basn%/%.basn%rds LINE 1 ITEM %.basn%rds-id]
32. &severity &error &fail
33. &type setting road id to %.rdid%...
34. /* Reselect all attributes
35. aselect %.PTH2%%.basn%/%.basn%rds arcs MAPE
36. &messages &on
37. &type Selection complete.
38. &return
39. &routine redo
40. /* No arc identified select all arcs again
41. &severity &error &fail
42. aselect %.PTH2%%.basn%/%.basn%rds arcs MAPE
43. &popup %.PTH%missed.txt
44. aselect %.PTH2%%.basn%/%.basn%rds arcs MAPE
45. &messages &on
46. &return &error

1. /* Name: **idstrm.aml**
2. /*---------------------
3. /* Purpose: Requests user to identify stretch of stream to be used in conjunction
4. /* with selected road to locate watershed outfall.
5. /*
6. /*---------------------
7. /* Calls: None
8. /*---------------------
9. /* Called by: basins.menu
10. /*---------------------
11. /* Required variables: .PTH .PTH2 .basn
12. /*---------------------
13. /* Global variables set: .strmid
14. /*---------------------

15. /* Creation Information
16. /* Author: Peter N. Smith, P.E.
17. /* Original coding date: 12/02/94
18. /* Last update: 3/30/95
19. /*----------------------
20. /* Remarks:
21. /*
22. /*----------------------
23. LINECOLOR 2
24. &type 'Please select a stream.'
25. &severity &error &routine redo
26. /* User select arc with mouse
27. RESELECT %.PTH2%%.basn%/%.basn%sarc ARCS ONE *
28. &messages &off
29. &sv .strmid := [SHOW SELECT %.PTH2%%.basn%/%.basn%sarc LINE 1 ITEM %.basn%sarc-id]
30. &type setting stream id to %.strmid%...
31. &type Reselecting all attributes
32. aselect %.PTH2%%.basn%/%.basn%sarc arcs MAPE
33. &messages &on
34. &type Selection complete.
35. &return
36. &routine redo
37. /* No stream selected, reselect all arcs
38. &severity &error &fail
39. aselect %.PTH2%%.basn%/%.basn%sarc arcs MAPE
40. &popup %.PTH%missed.txt
41. &messages &on
42. &return &error

1. /* Name: **infiles.aml**
2. /*----------------------
3. /* Purpose: This aml requests desired coverage database and sets variables for the
4. /* selected coverage database. Also established initial map extent for display and
5. /* search tolerance for subsequent identification of arcs.
6. /*----------------------
7. /* Calls:
8. /*----------------------
9. /* Called by: basins.menu
10. /*----------------------
11. /* Required variables: .PTH .PTH2 .scale .suff .upsc .basn
12. /*----------------------
13. /* Global variables set: .wspace .data .basn .outfall
14. /*----------------------
15. /* Creation Information
16. /* Author: Peter N. Smith, P.E.
17. /* Original coding date: 12/01/94
18. /* Last update: 4/12/95
19. /*----------------------
20. /* Remarks:
21. /*
22. /*----------------------
23. setmask off
24. setwindow maxof
25. /* Save the current workspace name
26. &sv .wspace = [show wo]
27. &wo [trim %.PTH2% -right /]
28. /* Determine which data set to use
29. &sv .data = [getfile * -workspaces 'Select your data source']
30. &sv .basn = [entryname %.data%]
31. /* On start up no outfall will have been specified

32.  &sv .outfall = n
33.  &wo %.wspace%
34.  MAPE %.PTH2%%.basn%/%.basn%bas
35.  &describe %.PTH2%%.basn%/%.basn%bas
36.  /* set the tolerance as 4 times cell size
37.  searchtolerance [calc %GRD$DX% * 4]
38.  &return


1.   /* Name: **line.aml**
2.   /*----------------------
3.   /* Purpose: This aml allows identification of pour points using a user-defined
4.   /* polygon.
5.   /*----------------------
6.   /* Calls: None
7.   /*----------------------
8.   /* Called by: basins.menu
9.   /*----------------------
10.  /* Required variables: .PTH .PTH2 .basn .suff
11.  /*----------------------
12.  /* Global variables set: .suff
13.  /*----------------------
14.  /* Data created: %.basn%pp%.suff% or %.basn%spp%.suff%
15.  /*----------------------
16.  /* Creation Information
17.  /* Author: Peter N. Smith, P.E.
18.  /* Original coding date: 4/14/95
19.  /* Last update: 4/18/95
20.  /*----------------------
21.  /* Remarks: At least three nodes are required. The cell with the maximum flow
22.  /* accumulation inside the polygon will be selected as the pour point.
23.  /* For a single pour point, the Watershed/ Area option should subsequently be
24.  /* selected. Watershed/Subareas for multiple pour points.
25.  /*
26.  /*----------------------
27.  /*
28.  &sv .suff [response 'Enter the suffix name for files to be created (e.g. a)']
29.  &do &while [exists %.basn%pp%.suff% -grid]
30.      &type %.basn%pp%.suff% already exists.
31.      &sv .suff = [response 'Please enter a new suffix e.g. b or c ..']
32.  &end
33.  &popup %.PTH%selw.txt
34.  /* A bug in Arc/info does prevents interactive selection of box without
35.  /* first drawing something else!
36.  arcs %.pth2%tx/txpoly
37.  /* Request user to define window extent (snapped to flow accumulation grid)
38.  setwindow * %.PTH2%%.basn%/%.basn%acc
39.  &popup %.pth%pps.txt
40.  &sv count = 1
41.  &sv stop =
42.  &s .merge =
43.  /* Allow user to establish as many polygons as desired.
44.  /* A grid is created for each pour point then when the user is
45.  /* finished all pour points are merged into one grid
46.  &do &until %stop% = y or %stop% = Y
47.      /* select a point and create grid
48.      pp%count% = con (zonalmax (int (selectpolygon (%.PTH2%%.basn%/%.basn%acc, *) / %.PTH2%%.basn%/%.basn%acc), %.PTH2%%.basn%/%.basn%acc) == ~
     %.PTH2%%.basn%/%.basn%acc, %count%)
49.      %.PTH2%%.basn%/%.basn%acc, %count%)
50.      /* same problem here with interactive drawing
51.      arcs %.PTH2%tx/txpoly

```
52.        &sv stop = [response 'Finished? (y)']
53.        /* Store all names of individual pour point grids
54.        &sv .merge = %.merge%pp%count%,
55.        &sv count = %count% + 1
56.    &end
57.    &sv count = %count% - 1
58.    /* store number of pour points created
59.    &sv .nopps = %count%
60.    &sv merge = [trim %.merge% -right ,]
61.    /* For one pour point only, save file for use in Watershed/area, otherwise for
62.    /* use in Watershed/Subareas
63.    &if %.nopps% = 1 &then %.basn%pp%.suff% = int (merge (%merge%))
64.    &else %.basn%spp%.suff% = int (merge (%merge%))
65.    /* Ensure sequential numbering of pour point values starting from one
66.    &dv .merge
67.    &do &until %count% = 0
68.    &if [exists pp%count% -grid] &then kill pp%count% all
69.    &sv count = %count% - 1
70.    &end
71.    &popup %.pth%ppend.txt
72.    &sv .outfall = y
73.    &return


1.    /* Name: luadd.aml
2.    /*---------------------
3.    /* Purpose: Checks to see if changes can be made to land use table (rcns.dat)
4.    /* and  sets environment for modifying table, then initiates menu for updating
5.    /* table.
6.    /*---------------------
7.    /* Calls: lu_rcn.men
8.    /*---------------------
9.    /* Called by: lu.men
10.   /*---------------------
11.   /* Required variables: .PTH .PTH2 .basn .suff
12.   /*---------------------
13.   /* Global variables set:
14.   /*---------------------
15.   /* Creation Information
16.   /* Author: Peter N. Smith, P.E.
17.   /* Original coding date: 04/01/95
18.   /* Last update: 04/05/95
19.   /*---------------------
20.   /* Remarks:
21.   /* Have problems modifying table from any directory other than location of table, so
22.   /* routine saves workspace location to return after table modification is done.
23.   /*---------------------
24.   /*
25.   /* add new lucode and rcns to permanent table or adjust rcns
26.   &if %.pth% NE cdrom/thesis/amls/ &then &do
27.        &sv q [response 'Sure you want to make changes to the permanent table? (YES/N)']
28.        &if %q% = YES &then &do
29.                &popup %.pth%adjtab.txt
30.                &sv .home = [show workspace]
31.                &wo %.pth2%tables
32.                &menu %.pth%lu_rcn.men &stripe 'LU/RCN/SoilGRP Table'
33.                &wo %.home%
34.        &end
35.   &end
36.   &else &type Since you are running off the CDROM, no changes can be made.
37.   &type Done
```

38.   &return

1.    /* Name: **luadj.aml**
2.    /*----------------------
3.    /* Purpose: Allows user-defined polygons to modify grid of land use codes and,
4.    /* if necessary add new land use codes/RCN's to permanent database.
5.    /*
6.    /*----------------------
7.    /* Calls: lu.men
8.    /*----------------------
9.    /* Called by: rcn.aml
10.   /*----------------------
11.   /* Required variables: .PTH .PTH2 .basn .suff
12.   /*----------------------
13.   /* Global variables set:
14.   /*----------------------
15.   /* Creation Information
16.   /* Author: Peter N. Smith, P.E.
17.   /* Original coding date: 04/01/95
18.   /* Last update: 04/05/95
19.   /*----------------------
20.   /* Remarks: The user-defined polygons only modify the land use codes for the working
21.   /* grid of land use, not the permanent vector coverage.
22.   /*
23.   /*----------------------
24.   /*
25.   clear
26.   &if [exists %.basn%pth%.suff% -grid] &then mape %.basn%pth%.suff%
27.   &else &do
28.       &sv .MASK = %.basn%shed%.suff%
29.       &run %.pth%winset.aml
30.       mape [show setwindow]
31.   &end
32.   &menu %.pth%lu.men &pulldown &stripe 'Land Use/ RCN Adjustment'
33.   &return

1.    /* Name: **lupoly.aml**
2.    /*----------------------
3.    /* Purpose: Draw polygons to update landuse values
4.    /*
5.    /*----------------------
6.    /* Calls: none
7.    /*----------------------
8.    /* Called by: lu.menu
9.    /*----------------------
10.   /* Required variables: .PTH .PTH2 .basn .suff
11.   /*----------------------
12.   /* Global variables set:
13.   /*----------------------
14.   /* Creation Information
15.   /* Author: Peter N. Smith, P.E.
16.   /* Original coding date: 01/04/95
17.   /* Last update:
18.   /*----------------------
19.   /* Remarks: The value assigned to the land use polygon must represent a
20.   /* land use code and should be set using setval in lu.menu prior to this
21.   /* Currently assumes lucode already exists with associated RCN's - modify later
22.   /*----------------------
23.   /*
24.   /*

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25.    &if NOT [null %.lucode%] &then &do
26.         setmask off
27.         &popup %.pth%poly.txt
28.         &sv count = 1
29.         &sv .merge =
30.         &do &until %more% = y or %more% = Y
31.                 lu%count% = selectpolygon (%.basn%shed%.suff%, *) * %.lucode%
32.    /* the following is merely to overcome a problem in grid which
33.    /* otherwise does not allow sequential drawing of polys. Drawing any
34.    /* other grid or arc will avoid the problem!
35.                 arcs  %.basn%tmp%.suff%
36.                 &sv more = [response 'Finished? (y)']
37.                 &sv .merge = %.merge%lu%count%,
38.                 &sv count = %count% + 1
39.         &end
40.         &sv count = %count% - 1
41.         &sv merge = [trim %.merge% -right ,]
42.         %.basn%lunew%.suff% = merge (%merge%)
43.         &dv .merge
44.         &do &until %count% = 0
45.                 &if [exists lu%count% -grid] &then kill lu%count% all
46.                 &sv count = %count% - 1
47.         &end
48.         lutmp = merge (%.basn%lunew%.suff%, %.basn%lugrd%.suff%)
49.         &if [exists %.basn%lugrd%.suff% -grid] &then kill %.basn%lugrd%.suff% all
50.         &if [exists %.basn%lunew%.suff% -grid] &then kill %.basn%lunew%.suff% all
51.         %.basn%lugrd%.suff% = lutmp
52.         &if [exists lutmp -grid] &then kill lutmp all
53.         arcs  %.basn%tmp%.suff%
54.    &end
55.    &else &popup %.pth%nocode.txt
56.    &type Done
57.    &return


1.     /* Name: modrcn.aml
2.     /*---------------------
3.     /* Purpose: Accesses land use / RCN table for modification
4.     /*---------------------
5.     /* Calls: None
6.     /*---------------------
7.     /* Called by: lu_rcn.men
8.     /*---------------------
9.     /* Required variables:
10.    /*---------------------
11.    /* Global variables set: None
12.    /*---------------------
13.    /* Data created: modifies rcns.dat
14.    /*---------------------
15.    /* Creation Information
16.    /* Author: Peter N. Smith, P.E.
17.    /* Original coding date: 3/31/95
18.    /* Last update: 5/8/95
19.    /*---------------------
20.    /* Remarks:
21.    /*---------------------
22.    /*
23.    &data arc tables
24.    select rcns.dat
25.    update
26.    &end
```

27.    &return

/* Name: **mvgage.aml**
1.    /*----------------------
2.    /* Purpose: Creates grid of interactively relocated streamgages from original vector
3.    /* coverage without modifying existing coverage. This allows the user to ensure that a
4.    /* gage record is placed on the apprpriate stretch of stream.
5.    /*----------------------
6.    /* Calls: None
7.    /*----------------------
8.    /* Called by: gage.men
9.    /*----------------------
10.    /* Required variables: .PTH .PTH2 .basn .suff
11.    /*----------------------
12.    /* Global variables set:
13.    /*----------------------
14.    /* Data created:  %.basn%gages%.suff%
15.    /*----------------------
16.    /* Creation Information
17.    /* Author: Peter N. Smith, P.E.
18.    /* Original coding date: 3/31/95
19.    /* Last update: 4/18/95
20.    /*----------------------
21.    /* Remarks: This routine does not actually move the vector points which represent a gage.
22.    /* The gage id of a selected streamgage is assigned to the selected cell in a separate grid
23.    /* and the attributes of the gage are added to the vat.
24.    /*----------------------
25.    /*
26.    /* The gage coverage and stream grid should first be in view.
27.    &sv count = 1
28.    &sv more = n
29.    &s .merge =
30.    &type Please set the search tolerance
31.    searchtolerance *
32.    &do &until %more% = y or %more% = Y
33.        /* select the gage
34.        RESELECT %.PTH2%tx/txgages points ONE *
35.        &sv .ggeid = [SHOW SELECT %.PTH2%tx/txgages point 1 ITEM txgages-id]
36.        &type Select the move to cell
37.        aselect %.PTH2%tx/txgages points txgages-id > 0
38.        /* Assumes value of 1 in gstrms. If using other grid with values other than one
39.        /* simply divide grid by itself in selectpoint statement
40.        gage%count% = selectpoint (%.pth2%%.basn%/%.basn%strms, *) * %.ggeid%
41.        &sv more = [response 'Finished? (y)']
42.        /* Could also try merging one by one in previous loop
43.        &sv .merge = %.merge%gage%count%,
44.        &sv count = %count% + 1
45.    &end
46.    &sv count = %count% - 1
47.    &sv merge = [trim %.merge% -right ,]
48.    %.basn%gge%.suff% = merge (%merge%)
49.    &dv .merge
50.    &label skip
51.    &data arc tables
52.    select %.basn%gge%.suff%.vat
53.    alter value
54.    
55.    
56.    
57.    txgages-id

58.
59.  quit
60.  &end
61.  &sys arc joinitem %.basn%gge%.suff%.vat %.PTH2%tx/txgages.pat %.basn%gge%.suff%.vat txgages-id count
62.  &do &until %count% = 0
63.  &if [exists gage%count% -grid] &then kill gage%count% all
64.  &sv count = %count% - 1
65.  &end
66.  &type You now have a grid coverage of selected stream gages named %.basn%gge%.suff%
67.  &return


1.   /* Name: **outfall.aml**
2.   /*----------------------
3.   /* Purpose: This aml allows user selction of outfall locations
4.   /* by identifying individual cells.
5.   /*
6.   /*----------------------
7.   /* Calls: None
8.   /*----------------------
9.   /* Called by: basins.menu
10.  /*----------------------
11.  /* Required variables: .PTH .PTH2 .basn .suff .outfall
12.  /*----------------------
13.  /* Global variables set: .suff .outfall .nopps
14.  /*----------------------
15.  /* Data created: %.basn%pp%.suff% or %.basn%spp%.suff%
16.  /*----------------------
17.  /* Creation Information
18.  /* Author: Peter N. Smith, P.E.
19.  /* Original coding date: 03/29/94
20.  /* Last update: 4/18/95
21.  /*----------------------
22.  /* Remarks: If one cell is selected then the Watershed/Area should be used after
23.  /* this routine. For two or more pour points, the Watershed/Subareas routine
24.  /* should be selected. This is a less secure way of identify outfall since the
25.  /* arcs and grid accuracy is limited. The road/stream intersection or line methods
26.  /* are better.
27.  /*
28.  /*----------------------
29.  &sv .suff [response 'Enter the suffix name for files to be created (e.g. a)']
30.  &do &while [exists %.basn%pp%.suff% -grid]
31.          &type %.basn%pp%.suff% already exists.
32.          &sv .suff = [response 'Please enter a new suffix e.g. b or c ..']
33.  &end
34.  &popup %.PTH%selw.txt
35.  /* the next line could be any draw item to avoid a bug incurred
36.  /* by previous use of the select command
37.  arcs %.pth2%tx/txpoly
38.  /* use accumulation grid as snap-to for window to ensure coincidence of
39.  /* subsequent grids.
40.  setwindow * %.PTH2%%.basn%/%.basn%acc
41.  &popup %.pth%pps.txt
42.  &sv count = 1
43.  &sv stop =
44.  &s .merge =
45.  /* Allow user to specify multiple pour points if desired.
46.  /* Each pour point is saved as a grid, then all pour points are merged
47.  /* into one grid.
48.  &do &until %stop% = y or %stop% = Y
49.          /* select a point and create grid

```
50.          pp%count% = int (selectpoint (%.PTH2%%.basn%/%.basn%acc, *) ~
51.          / %.PTH2%%.basn%/%.basn%acc * %count%)
52.          arcs %.PTH2%tx/txpoly
53.          &sv stop = [response 'Finished? (y)']
54.          /* save the names of pour point files as one character string
55.          &sv .merge = %.merge%pp%count%,
56.          &sv count = %count% + 1
57.   &end
58.   &sv count = %count% - 1
59.   &sv .nopps = %count%
60.   /* merge individual pour point grids into one
61.   &sv merge = [trim %.merge% -right ,]
62.   /* If only one pp, save for use in Watershed/Area, otherwise for
63.   /* Watareshed/Subareas
64.   &if %.nopps% = 1 &then %.basn%pp%.suff% = merge (%merge%)
65.   &else %.basn%spp%.suff% = merge (%merge%)
66.   /* Ensure sequential numbering of pour point values starting from one
67.   &dv .merge
68.   &do &until %count% = 0
69.   &if [exists pp%count% -grid] &then kill pp%count% all
70.   &sv count = %count% - 1
71.   &end
72.   &popup %.pth%ppend.txt
73.   &sv .outfall = y
74.   &return


1.    /* Name: ppgge.aml
2.    /*---------------------
3.    /* Purpose: Sets previously created grid gage as pour point file for subsequent
4.    /* delineation of areas
5.    /*
6.    /*---------------------
7.    /* Calls: None
8.    /*---------------------
9.    /* Called by: gage.men
10.   /*---------------------
11.   /* Required variables: .PTH .PTH2 .basn .suff .
12.   /*---------------------
13.   /* Global variables set: .suff .outfall .nopps
14.   /*---------------------
15.   /* Data created: %.basn%pp%.suff% or %.basn%spp%.suff%
16.   /*---------------------
17.   /* Creation Information
18.   /* Author: Peter N. Smith, P.E.
19.   /* Original coding date: 4/10/94
20.   /* Last update: 4/12/95
21.   /*---------------------
22.   /* Remarks:
23.   /*
24.   /*---------------------
25.   &if [exists %.basn%gge%.suff% -grid] &then &do
26.          &sv .gpp = [response 'Do you wish to use the gage locations for determining areas? (Y or N)']
27.   &if %.gpp% = Y or %.gpp% = y or %.gpp% = YES or %.gpp% = yes &then &do
28.          &sv .suff = [response 'Enter the suffix for your proposed data sets']
29.          &if [exists ycell%.suff% -grid] &then kill ycell%.suff% all
30.          &if [exists xcell%.suff% -grid] &then kill xcell%.suff% all
31.          &do &while [exists %.basn%shed%.suff% -grid]
32.                          &type %.basn%shed%.suff% already exists
33.                          &sv .suff = [response 'Please enter a new suffix e.g. b or c or bb etc...']
34.                 &end
```

```
35.              &describe %.basn%gge%.suff%
36.              &sv .nopps = %grd$nclass%
37.              &if %.nopps% = 1 &then &do
38.                        &if [exists %.basn%pp%.suff% -grid] &then kill %.basn%pp%.suff%
39.                        copy %.basn%gge%.suff% %.basn%pp%.suff%
40.              &end
41.              &else &do
42.                        &if [exists %.basn%spp%.suff% -grid] &then kill %.basn%spp%.suff%
43.                        copy %.basn%gge%.suff% %.basn%spp%.suff%
44.              &end
45.              &sv .outfall = y
46.              &popup %.PTH%selw.txt
47.              setwindow * %.pth2%%.basn%/%.basn%acc
48.        &end
49.  &end
50.  &else &type %.basn%gge%.suff% Does not exist. Please move gages first.
51.  &type Done
52.  &return


53.  /* Name: preproc.aml
54.  /*----------------------
55.  /* Purpose: This is a preprocessing aml that is intended to set up coverages required
56.  /* for the Hydrologic Data Development System.
57.  /*
58.  /*----------------------
59.  /* Calls: None
60.  /*----------------------
61.  /* Called by: basins.menu
62.  /*----------------------
63.  /* Required variables: .PTH .PTH2 .basn .suff .prefix .dir .FILE .dem .GO .mergfil .wspace .HWY .proj
64.  /* .units .zunits .datum .sph .zone .scale .upsc
65.  /*----------------------
66.  /* Global variables set: .prefix .dir .FILE .dem .GO .mergfil .wspace .HWY .proj
67.  /* .units .zunits .datum .sph .zone
68.  /*----------------------
69.  /* Creation Information
70.  /* Author: Peter N. Smith, P.E.
71.  /* Original coding date: 01/28/95
72.  /* Last update: 3/30/95
73.  /*----------------------
74.  /* Remarks: Only sets up dem-based and highway-based data.
75.  /* i.e. filled dem, flowdirection, flowaccumulation, gridded streams,
76.  /* stream links, arc streams, cell slope, drainage basins, and highway grid
77.  /*----------------------
78.  /*
79.  &sv .prefix = [response 'What do you want to call this system of data?']
80.  &sv .dir = [response 'Please enter the full path to the directory in which the ~
81.  dem data reside']
82.  &sv .HWY = [response 'Enter the arc coverage name of the highways']
83.  /* can use an existing ascii file of dem names. First line must have record name
84.  /* or other, second through penultimate must contain dem grid name (one per line)
85.  /* last line must be "end". The option Up-scale/fndquad can be used to find the
86.  /* names associated with the current delineated watershed.
87.  &if [exists %.basn%qds%.suff% -cover] &then &do
88.        &type The current quad file is %.basn%qds%.suff%.dat
89.        &sv q = [response 'Do you wish to use the quads in this file?']
90.        &if %q% = Y or %q% = y &then &do
91.                  &sv .FILE = %.basn%qds%.suff%.qd
92.        &end
93.        &else &do
```

```
94.                    &sv .FILE = [getfile *qds*.qd -NONE -OTHER 'Choose which quad index file you need']
95.        &end
96.    &end
97.    &else &do
98.        &sv .FILE = [getfile *.qd -NONE -OTHER 'Choose which quad index file you need']
99.    &end
100.   /* if no name file selected, request name of only one dem for processing.
101.   &if [NULL %.FILE%] &then &do
102.        &popup %.PTH%qdfile.txt
103.        &sv .dem = [response 'Enter the name of the DEM file']
104.        &if [NULL %.dem%] = .FALSE. &then &do
105.                    /* check that dem exists
106.                    &if [exists %.dir%/%.dem% -grid] &then &do
107.                            &sv .GO = Y
108.                    &end
109.                    &else &do
110.                            &type %.dir%/%.dem% does not exist.
111.                            &sv .GO = N
112.                    &end
113.        &end
114.        &else &do
115.                    /* No Go ! Just checking balance of if's and elses
116.                    &sv .GO = N
117.        &end
118.   &end /* If only one dem so miss merge routines
119.   &else &do
120.   /* check if quads exist
121.   /* open and read quad file
122.        &type 1
123.        &sv unit = [open %.FILE% openstat -read]
124.        &if %openstat% = 0 &then &do
125.                    &sv quad = start
126.                    &sv count = 1
127.                    &sv .GO = Y
128.                    &sv .mergfil
129.                    &sv .quad%count% = [read %unit% readstat]
130.                    &do &until %quad% = end /*end of file
131.                            &sv quad = [read %unit% readstat]
132.                            &if %quad% NE end &then
133.                                    &if [exists %.dir%/%quad% -grid] = .FALSE. &then &do
134.                                            &type The dem quad %.dir%/%quad% does not exist
135.                                            &sv .GO = N
136.                                    &end
137.                                    &else &do
138.                                            &sv .quad%count% = %quad%
139.                                            &type [value .quad%count%]
140.                                            &sv .mergfil = %.mergfil%[value .quad%count%],
141.                                    &end
142.                            &sv count = %count% + 1
143.                            &end
144.                    &end
145.                    &sv .no = %count% - 1
146.                    &sv closestat = [close %unit%]
147.                    &sv .mergfil = [trim %.mergfil% -right ,]
148.                    &if %closestat% = 0 &then
149.                            &type File closed
150.   /*&else &do
151.                    /*&type Couldn't open file. Please start over from Data/Preprocess
152.                    /*&sv .GO = N
153.        /*&end
```

```
154.  &end
155.  &if %.GO% = Y &then &do
156.        setwindow MAXOF
157.        &sys arc createworkspace %.PTH2%%.prefix%
158.        &sv .wspace = [show workspace]
159.        &wo %.dir%
160.        &if [NULL %.FILE%] = .FALSE. &then &do
161.                /* Note: Not valid if original data in multiple UTM zones. need to put in warning.
162.                %.PTH2%%.prefix%/%.prefix%dem1 = merge (%.mergfil%)
163.        &end
164.        &else &do
165.        %.PTH2%%.prefix%/%.prefix%dem1 = %.dem%
166.        &end
167.        &wo %.PTH2%%.prefix%
168.        &if [NULL %.scale%] &then
169.        &sv .scale = [getchoice 1:250K 1:24K -prompt 'At what scale is the data?']
170.        /* Determine existing projection parameters
171.        /* Currently transforms to Albers equal area
172.        &type 2
173.        &describe %.prefix%dem1
174.        &sv .proj = %PRJ$NAME%
175.        &sv .units = %PRJ$UNITS%
176.        &sv .zunits = %PRJ$ZUNITS%
177.        &sv .datum = %PRJ$DATUM%
178.        &sv .sph = %PRJ$SPHEROID%
179.        &sv .zone = %PRJ$ZONE%
180.        &type Projecting the file to Albers equal area ...
181.  /* This is specific to USGS DEM data. The 1:250k are in geographic
182.  /* and the 1:24 for Texas are in UTM. The routine stores the existing
183.  /* projection parameters to be used as variables in the appropriate
184.  /* projection file. This seems necessary because the project command will not
185.  /* default to the existing input projection parameters if a projection
186.  /* file is specified. If the user desires to transform using alternate
187.  /* projection parameters, simply alter the ASCII files geoalb.prj and
188.  /* utmalb.prj to reflect the desired parameters.
189.        &if %.SCALE% = 1:250k or %.SCALE% = 1:250K &then &do
190.                %.prefix%dem = project (%.prefix%dem1, %.PTH%geoalb.prj)
191.        &end
192.        &if %.SCALE% = 1:24k or %.SCALE% = 1:24K &then &do
193.                %.prefix%dem = project (%.prefix%dem1, %.PTH%utmalb.prj)
194.        &end
195.        &if NOT [null %.upsc%] &then &do
196.                &if [exists %.wspace%/%.basn%pth%.suff%] &then
197.                        setwindow %.wspace%/%.basn%pth%.suff%
198.                &else
199.                        setwindow %.wspace%/%.basn%shed%.suff%
200.        &end
201.        /* fill dem
202.        fill %.prefix%dem %.prefix%fil1
203.        /* Sometimes need to fill twice, other times superfluous
204.        fill %.prefix%fil1 %.prefix%fil
205.        kill %.prefix%fil1 all
206.        /* Create flowdirection, flowaccumulation, streams, streamlinks, basin
207.        %.prefix%dir = flowdirection (%.prefix%fil)
208.        %.prefix%acc = flowaccumulation (%.prefix%dir)
209.        &describe %.prefix%acc
210.        &sv thresh = [round [calc 250000 / %GRD$DX%]]
211.        %.prefix%strms = con (%.prefix%acc > %thresh%, 1)
212.        %.prefix%bas = basin (%.prefix%dir)
213.        %.prefix%slnk = STREAMLINK (%.prefix%strm, %.prefix%dir)
```

214.        %.prefix%sarc = streamline (%.prefix%slnk, %.prefix%dir)
215.        %.prefix%slope = slope (%.prefix%fil, PERCENTRISE)
216.        setwindow %.prefix%fil
217.        %.prefix%rdgrd = linegrid (%.HWY%, [entryname %.HWY%-id], #, #, %GRD$DX%)
218.        /* need to clip HWY down to window area instead of converting grid back to lines
219.        %.prefix%rds = gridline (%.prefix%rdgrd, #, #, #, #, %.prefix%rds-id)
220.        &wo %.wspace%
221.        &popup %.PTH%newdat.txt
222.        &label skip3
223. &end
224. &return


1.     /* Name: **pthleng.aml**
2.     /*---------------------
3.     /* Purpose: Determines the longest travel distance and path from watershed boundary to outfall
4.     /*
5.     /*---------------------
6.     /* Calls: winset.aml
7.     /*---------------------
8.     /* Called by: basins.menu
9.     /*---------------------
10.     /* Required variables: .PTH .PTH2 .basn .suff .upsc .outfall .rdid .strmid
11.     /*---------------------
12.     /* Global variables set: .MASK .LENGTH
13.     /*---------------------
14.     /* Data created:  %.basn%up%.suff% %.basn%dn%.suff% %.basn%l%.suff%
15.     /*---------------------
16.     /* Creation Information
17.     /* Author: Peter N. Smith, P.E.
18.     /* Original coding date: 12/16/94
19.     /* Last update: 5/08/95
20.     /*---------------------
21.     /* Remarks: Not to be confused with path for time of concentration which may differ
22.     /* Adds resulting length to watershed attribute table
23.     /*---------------------
24.     /*
25.     /* Ensure that Watershed/Area has already been run
26.     &if [exists %.basn%shed%.suff% -grid] &then &do
27.        &sv .MASK = %.basn%shed%.suff%
28.        /* Reduce analysis window to just include watershed area
29.        &run %.PTH%winset.aml
30.        /* Determine upstream flowlength in watershed
31.        %.basn%up%.suff% = flowlength ( selectmask (%.PTH2%%.basn%/%.basn%dir, ~
32.        %.basn%shed%.suff%), #, UPSTREAM)
33.        /* longest travel distance is maximum value in grid and occurs at the pour point
34.        &describe %.basn%up%.suff%
35.        &sv .LENGTH = [round  %GRD$ZMAX%] / 1000
36.        /* Determine downstream flowlength in watershed
37.        %.basn%dn%.suff% = flowlength ( selectmask (%.PTH2%%.basn%/%.basn%dir, ~
38.        %.basn%shed%.suff%), #, DOWNSTREAM)
39.        %.basn%l%.suff% = ZONALMAX (%.basn%shed%.suff%, ~
40.        %.basn%up%.suff%)
41.     /*
42.     /* The sum of the upstream flowlength grid and downstream flowlength grid
43.     /* should yield a grid in which a unique string of cells contain the maximum length value.
44.     /* All other cells with have values less than this. Then isolate cells to determine flowpath
45.     /* Value of 1 in %.basn%shed%.suff% is subtracted to account for possible rounding
46.     /* errors in summation.
47.     /*
48.        %.basn%pth%.suff% = con (%.basn%up%.suff% + %.basn%dn%.suff% ~

```
49.        > %.basn%l%.suff% ~
50.        - 1, 1)
51.        /* Convert grid to vector coverage for display
52.        %.basn%ptharc%.suff% = gridline (%.basn%pth%.suff%)
53.        linecolor 2
54.        arcs %.basn%ptharc%.suff%
55.        &type 'The longest path length is' %.LENGTH% km
56.        /* Add pathlength as attribute in %.basn%shed%.suff%
57.        /*&label skip
58. /* no indentation is use here because it seems to affect the tables environment
59. &data arc tables
60. additem %.basn%tmp%.suff%.pat Calc_pthl(km) 10 10 N 3
61. select %.basn%tmp%.suff%.pat
62. reselect $recno = 2
63. calc Calc_pthl(km) = %.LENGTH%
64. quit
65. &end
66.        &popup %.PTH%pthend.txt
67. &end
68. &else &do
69.        &popup %.PTH%doshed.txt
70. &end
71. &type Done
72. &return


1.   /* Name: rcn.aml
2.   /*---------------------
3.   /* Purpose: Uses watershed or subarea grid to clip landuse and soils coverage,
4.   /* convert to grid, allow user-modified land use, and compute weighted RCN's in grid
5.   /*
6.   /*---------------------
7.   /* Calls: luadj.aml
8.   /*---------------------
9.   /* Called by: basins.men
10.  /*---------------------
11.  /* Required variables: .PTH .PTH2 .basn .suff
12.  /*---------------------
13.  /* Global variables set:
14.  /*---------------------
15.  /* Data created: %.basn%lugrd%.suff% %.basn%slgrd%.suff% %.BASN%WTRCN%.SUFF%
16.  /* %.BASN%RCN%.SUFF%
17.  /*---------------------
18.  /* Creation Information
19.  /* Author: Peter N. Smith, P.E.
20.  /* Original coding date: 03/20/95
21.  /* Last update: 05/08/95
22.  /*---------------------
23.  /* Remarks: Adds weighted RCN's to watershed PAT or subarea PAT requested
24.  /* The coverage joins data from rcns.dat a table of landuse v hydrologic soil
25.  /* group.
26.  /*
27.  /*---------------------
28.  /*
29.  &if not [exists %.basn%shed%.suff% -grid] &then &do
30.        &popup %.pth%noshed.txt; &return
31.  &end
32.  &if [exists %.basn%lugrd%.suff% -grid] &then kill %.basn%lugrd%.suff%
33.  &if [exists %.basn%slgrd%.suff% -grid] &then kill %.basn%slgrd%.suff%
34.  &if [exists %.basn%wtrcn%.suff% -grid] &then kill %.basn%wtrcn%.suff%
35.  &if [exists %.basn%rcn%.suff% -cover] &then kill %.basn%rcn%.suff%
```

```
36.  &sv q = [getchoice Watershed Subareas -prompt 'Select breakdown of RCN']
37.  &if %q% = Watershed &then
38.      &sv use = %.basn%shed%.suff%
39.  /* Note it is best to use %.basn%pth%.suff% to minimize data size
40.  &if %q% = Subareas &then
41.      &if [exists %.basn%sshed%.suff% -grid] &then
42.
43.      &else &do
44.              &popup %.pth%nosub.txt
45.              &return
46.      &end
47.  &if [exists %.basn%pth%.suff%] &then &do
48.      setwindow %.basn%pth%.suff% %.PTH2%%.basn%/%.basn%acc
49.      &describe %.basn%pth%.suff%
50.      &end
51.  &else &do
52.      &sv .mask %.basn%shed%.suff%
53.      &run %.PTH%winset
54.      &describe %.basn%shed%.suff%
55.      &end
56.  setmask off
57.  /*
58.  /* get extent of watershed grid and create clip cover from extent
59.  /*
60.  &sv .xmin %grd$xmin%
61.  &sv .ymin %grd$ymin%
62.  &sv .xmax %grd$xmax%
63.  &sv .ymax %grd$ymax%
64.  /* reduce lu to window area of watershed.
65.  &if [exists clippoly -cover] &then kill clippoly
66.  &data arc generate clippoly
67.  copytics %.basn%tmp%.suff%
68.  polygons
69.  %.xmax%,%.ymax%
70.  %.xmax%,%.ymax%
71.  %.xmax%,%.ymin%
72.  %.xmin%,%.ymin%
73.  %.xmin%,%.ymax%
74.  END
75.  END
76.  quit
77.  &end
78.  &sys arc build clippoly
79.  /*
80.  /* convert lu to grid using only extent of watershed
81.  /*
82.  &sys arc clip %.pth2%tx/txlus clippoly %.basn%luclp%.suff% poly
83.  %.basn%lugrd%.suff% = polygrid (%.basn%luclp%.suff%, lucode, #, #, %grd$dx%)
84.  kill %.basn%luclp%.suff% all
85.  /*
86.  /* convert soils to grid using window area of watershed.
87.  /* possibly use clippoly as with txlu if faster
88.  %.basn%slgrd%.suff% = polygrid (%.pth2%tx/statsgo, statsgo-id, #, #, %grd$dx%)
89.  setmask off
90.  &sv q2 = [response 'Do you wish to check and possibly modify landuse codes for this watershed?']
91.  &if %q2% = Y or %q2% = y &then &run %.pth%luadj.aml
92.  /* add (or maybe just relate later!) soil attributes
93.  &data arc tables
94.  select %.basn%lugrd%.suff%.vat
95.  alter value /* next 3 lines deliberately blank
```

96.
97.
98.
99. lucode
100. select %.basn%slgrd%.suff%.vat
101. alter value /* next 3 lines deliberately blank
102.
103.
104.
105. statsgo-id
106. quit
107. &end
108. &sys arc joinitem %.basn%lugrd%.suff%.vat %.pth2%tables/rcns.dat %.basn%lugrd%.suff%.vat ~
109. lucode count
110. &sys arc joinitem %.basn%slgrd%.suff%.vat %.pth2%tx/statsgo.pat %.basn%slgrd%.suff%.vat ~
111. statsgo-id count
112. Setmask %use%
113. setwindow %use% %.pth2%%.basn%/%.basn%acc
114. /* now for each cell in area calc wt rcn by determining rcn for each % of hyd group,
115. /* and wt per cell then mean value per wshed or subarea.
116. docell
117. /* wt rcn per cell, soil hydrologic group is in pct
118. /* Note : divide by total percentage incase do not add up exactly to 100%
119. totpct := %.basn%slgrd%.suff%.a-pct + %.basn%slgrd%.suff%.b-pct + %.basn%slgrd%.suff%.c-pct + %.basn%slgrd%.suff%.d-pct
120. wtcella := %.basn%slgrd%.suff%.a-pct * %.basn%lugrd%.suff%.hyd-a / totpct
121. wtcellb := %.basn%slgrd%.suff%.b-pct * %.basn%lugrd%.suff%.hyd-b / totpct
122. wtcellc := %.basn%slgrd%.suff%.c-pct * %.basn%lugrd%.suff%.HYD-C / totpct
123. wtcelld := %.basn%slgrd%.suff%.d-pct * %.basn%lugrd%.suff%.HYD-D / totpct
124. totwt = wtcella + wtcellb + wtcellc + wtcelld
125. end
126. /* note: for future distributed models could calc runoff for each cell.
127. /* return grid containing weighted rcn for each zone
128. %.BASN%WTRCN%.SUFF% = int (zonalmean (%use%, totwt) * 1000)
129. /* convert to polygon coverage
130. %.BASN%RCN%.SUFF% = gridpoly (%.BASN%WTRCN%.SUFF%)
131. kill totwt all
132. /* kill %.BASN%WTRCN%.SUFF% all
133. /* Add weighted RCN as attribute of polygon coverage
134. &if %use% = %.basn%shed%.suff% &then &do
135.      &describe %.BASN%WTRCN%.SUFF%
136. &data arc tables
137. additem %.basn%tmp%.suff%.pat Wt_RCN 7 7 n 3
138. select %.basn%tmp%.suff%.pat
139. reselect $recno = 2
140. calc Wt_RCN = %grd$zmax% / 1000
141. quit
142. &end
143. &end
144. &else &do
145. /* need to add each zone value to relevant subarea
146. /* need to find way of ensuring as many rcn's as suba's. - Currently, if same
147. /* rcn in several suba's then only one zone for those suba's (multiplied
148. /* vals by 1000 before rounding, then divide back by 1000)
149. &data arc tables
150. select %.BASN%RCN%.SUFF%.pat
151. alter grid-code
152. WT_RCN /* next 3 lines intentionally blank
153.
154.

155.
156. calc WT_RCN = WT_RCN / 1000
157. alter %.BASN%RCN%.SUFF%-id /* next 3 lines intentionally blank
158.
159.
160.
161. %.basn%sub%.suff%-id
162. quit
163. &end
164. &sys arc joinitem %.basn%sub%.suff%.pat %.BASN%RCN%.SUFF%.pat %.basn%sub%.suff%.pat %.basn%sub%.suff%-id Wsheda(sq.km)
165. list %.basn%sub%.suff%.pat
166. &end
167. &popup %.pth%endrcn.txt
168. &type Done
169. &return


1.    /* Name: **sclfctr.aml**
2.    /*---------------------
3.    /* Purpose: This AML calculates linear adjustment factors to accommodate
4.    /*the curvature of the Earth. Valid only for Albers meters/parameters as in txbas at the moment.
5.    /*---------------------
6.    /* Calls: None
7.    /*---------------------
8.    /* Called by: basins.menu
9.    /*---------------------
10.   /* Required variables: .PTH .PTH2 .basn .suff
11.   /*---------------------
12.   /* Global variables set: .L2
13.   /*---------------------
14.   /* Data created: H (meridian factor) K (parallel factor) L adjusted length, Adj length
15.   /* added to watershed PAT
16.   /*---------------------
17.   /* Creation Information
18.   /* Author: Peter N. Smith, P.E.
19.   /* Original coding date: 03/01/94
20.   /* Last update: 4/12/95
21.   /*---------------------
22.   /* Remarks: When using a cell resolution of 500m, this procedure is academic
23.   /* since the uncertainty in measurement of length generally will be far
24.   /* greater than the effect of the adjstment factor.
25.   /*---------------------
26.   /*
27.   &if [exists h -grid] &then kill h all
28.   &if [exists k -grid] &then kill k all
29.   &if [exists l -grid] &then kill l all
30.   &if [exists %.basn%pth%.suff% -grid] &then &do
31.   /* Check projection
32.   &describe %.basn%shed%.suff%
33.   &select %PRJ$NAME%
34.        &when ALBERS; &do
35.   /* %PRJ$UNITS% = METERS &then &do
36.   /*      &sv .check = [calc %.check% + 1]
37.   /*      &end
38.   /* &if %PRJ$SPHEROID% = GRS1980 &then &do
39.   /*      &sv .check = [calc %.check% + 1]
40.   /*      &end
41.   /*&if %PRJ$SP1% = '29 30 00*****' &then &do
42.   /*      &sv .check = [calc %.check% + 1]
43.   /*      &end

```
44.  /*&if %PRJ$SP2% = '45 30 00*****' &then &do
45.  /*       &sv .check = [calc %.check% + 1]
46.  /*       &end
47.  /*&if %PRJ$CM% = '-96 00 00*****' &then &do
48.  /*       &sv .check = [calc %.check% + 1]
49.  /*       &end
50.  /*&if %PRJ$LATORIG% = '23 00 00*****' &then &do
51.  /*       &sv .check = [calc %.check% + 1]
52.  /*       &end
53.  /*&if %PRJ$FE% = 0 AND %PRJ$FN% = 0 &then &do
54.  /*       &sv .check = [calc %.check% + 1]
55.  /*       &end
56.                &if %PRJ$UNITS% = METERS &then &do
57.                        &sv .am = 6378137
58.                        &sv .e = 0.081819221
59.                        &sv .m1 = 0.871062964
60.                        &sv .m2 = 0.702105833
61.                        &sv .q1 = 0.979314365
62.                        &sv .q2 = 1.4201783
63.                        &sv .q0 = 0.776760266
64.                        &sv .n = 0.602902769
65.                        &sv .C = 1.34918203
66.                        &sv .rho0 = 9928937.007
67.                        &sv .lam0 = [extract 1 %PRJ$CM%] + [extract 2 %PRJ$CM%] / 60 ~
68.                        + [truncate [extract 3 %PRJ$CM%]] / 3600
69.                        &sv mil = 1
70.                        &sv f1 = %mil% * [calc %.e% ** 2 / 3 + 31 * %.e% ** 4 / 180 + 517 * %.e% ** 6 /
5040] /* constant A in Sneider 3-18 / 3-34 P.16 and 19
71.                        &sv f2 = %mil% * [calc 23 * %.e% ** 4 / 360 + 251 * %.e% ** 6 / 3780] /* constant
B in Sneider 3-18 / 3-34 P.16 and 19
72.                        &sv f3 = %mil% * [calc 761 * %.e% ** 6 / 45360] /* constant C in Sneider 3-18 / 3-34
P.16 and 19
73.                        &sv l1 = %GRD$DX% /* cell width
74.                        &sv go = y
75.                &end
76.            &else &do
77.                    &type Sorry, only programmed for Albers/meters
78.                    &sv go = n
79.            &end
80.        &end
81.  &end
82.  &if %go% = y &then &do
83.  /* for each cell, calculate length factor based on direction of flow
84.  /* and centroidal coordinates
85.  setmask %.basn%pth%.suff%
86.  setwindow %.basn%pth%.suff%
87.  setcell %GRD$DX%
88.  /* xcell%.suff & %ycell%.suff% are grids containing
89.  /* the centroidal coordinates of each cell
90.  docell
91.  /* rho = [calc %x% ** 2 + [calc %.rho0% - %y%] ** 2] ** 0.5
92.       &type 1
93.       rho := pow (pow (xcell%.suff%, 2) + pow (%.rho0% - ycell%.suff%, 2), 0.5)
94.       &type 2
95.       theta := ATAN (xcell%.suff% / (%.rho0% - ycell%.suff%))
96.  /* theta = [ATAN [calc %x% / [calc %.rho0%  - %y%]]]
97.       &type 3
98.       q = (%.C% - pow (rho, 2) * pow (%.n%, 2) / pow (%.am%, 2)) / %.n%
99.       &type 4
100. /* component of 14-21 follows
```

```
101.        v := LN ((1 - %.e%) / ( 1 + %.e%))
102. /* Sneider equation 14-21 P102 follows
103.        &type 5
104.        beta := ASIN (q / (1 - (1 - pow (%.e%, 2)) / 2 / %.e% * v))
105. /* Sneider Equation 3-18 components represented by b2, b4 & b6 follow
106.        &type 6
107.        b2 := %f1% * SIN (2 * beta) /* radians
108.        &type 7
109.        b4 := %f2% * SIN (4 * beta) /* radians
110.        &type 8
111.        b6 := %f3% * SIN (4 * beta) /* radians
112. /* Sneider Eq 3-18 follows: Note phi in radians
113.        &type 9
114.        phi := %mil% * beta + b2 + b4 + b6
115.        &type 10
116. /* Sneider EQ 14-7 p 100 follows.
117. /* adjustment factor along meridian scaled up by 1 million
118.        h = 1000 * (cos (phi / %mil%) / pow (%.C% - 2 * %.n% * sin (phi / %mil%), 0.5))
119. /* note: K = 1/h  = factor along parallel ( Sneider 14-180 ) so no areal adjustment necessary.
120.        k = 1000000 / h
121. /* Now use h and k to adjust length of travel across each cell and summate to
122. /* determine adjusted length. Note: This is academic at the 1:2m scale due to the resolution
123. /* of cells (500 m)
124.        if (%.PTH2%%.basn%/%.basn%dir == 1 or %.PTH2%%.basn%/%.basn%dir == 16) l = %l1% * k
125.        else if (%.PTH2%%.basn%/%.basn%dir == 4 or %.PTH2%%.basn%/%.basn%dir == 64) l = %l1% * h
126.        else l = %l1% * pow (pow (h,2) + pow (k, 2), 0.5)
127.        endif
128. end
129. &if [exists q -grid] &then kill q all
130. %.basn%adj%.suff% = zonalsum (%.basn%pth%.suff%, l) / 1000
131. &describe %.basn%adj%.suff%
132. &sv .l2 = %grd$zmax%
133. &end
134. setmask off
135. /* Add adjusted length as attribute of polygon coverage
136. &data arc tables
137. additem %.basn%tmp%.suff%.pat ADJ_lngth(km) 10 10 N 2
138. select %.basn%tmp%.suff%.pat
139. reselect $recno = 2
140. calc ADJ_lngth(km) = %.l2% / 1000
141. quit
142. &type The adjusted length is %.l2% metres
143. &describe %.basn%up%.suff%
144. &type versus a plane length of %grd$zmax% metres
145. &end
146. &end
147. &else &type You need to run pathlength first!
148. &type Done
149. &return


1.     /* Name: shedmask.aml
2.     /*---------------------
3.     /* Purpose: This aml clips the following coverages to fit within the delineated watershed:
4.     /* Roads, Streams, Cities, County boundaries, aspect, streamgages.
5.     /* These may be used for plotting and or subsequent analysis such as:
6.     /* Subwatershed delineation
7.     /* Plotting drainage area map
8.     /*
9.     /*---------------------
10.    /* Calls: None
```

```
11.   /*---------------------
12.   /* Called by: basmenu.men
13.   /*---------------------
14.   /* Required variables: .PTH .PTH2 .basn .suff
15.   /*---------------------
16.   /* Global variables set: none
17.   /*---------------------
18.   /* Data created: %.basn%rd%.suff %.basn%strm%.suff% %.basn%cnty%.suff%
19.   /* %.basn%cty%.suff% %.basn%gage%.suff% %.basn%aspct%.suff%
20.   /*---------------------
21.   /* Creation Information
22.   /* Author: Peter N. Smith, P.E.
23.   /* Original coding date: 03/03/95
24.   /* Last update: 5/8/95
25.   /*---------------------
26.   /* Remarks:
27.   /*
28.   /*---------------------
29.   /*
30.   /* Use gridded are to mask grid coverages
31.   /* Use poly of wshed to clip arc coverages
32.   &if [exists %.basn%tmp%.suff% -cover] &then &do
33.        &messages &off
34.        &sv extent = %.basn%tmp%.suff%
35.        &if [exists %.basn%pth%.suff%] &then
36.        &sv extent = %.basn%pth%.suff%
37.        setwindow %extent%
38.        &sys arc clip %.PTH2%%.basn%/%.basn%rds %.basn%tmp%.suff% %.basn%rd%.suff% LINE
39.        &sys arc clip %.PTH2%%.basn%/%.basn%sarc %.basn%tmp%.suff% %.basn%strm%.suff% LINE
40.        &sys arc clip %.PTH2%tx/txcnty %.basn%tmp%.suff% %.basn%cnty%.suff%
41.        &sys arc clip %.PTH2%tx/txcty %.basn%tmp%.suff% %.basn%cty%.suff% POINT
42.        &sys arc clip %.PTH2%tx/txgages %.basn%tmp%.suff% %.basn%gage%.suff% POINT
43.        %.basn%aspct%.suff% = aspect (selectmask (%.PTH2%%.basn%/%.basn%fil, %.basn%shed%.suff%))
44.        &type The following arc coverages are available for plotting:
45.        &type %.basn%rd%.suff%, %.basn%strm%.suff%, %.basn%cnty%.suff%, %.basn%cty%.suff%,~
46.        %.basn%gage%.suff%, %.basn%aspct%.suff%
47.        &type
48.        clear
49.        mape %.basn%shed%.suff%
50.        gridpaint %.basn%aspct%.suff% value linear nowrap gray
51.        linecolor 1
52.        arcs %.basn%cnty%.suff%
53.        linecolor 5
54.        arcs %.basn%strm%.suff%
55.        linecolor 3
56.        arcs %.basn%rd%.suff%
57.        linecolor 0
58.        arcs %.basn%shed%.suff%
59.        &type Finished processing
60.        &messages &on
61.        setmask off
62.   &end
63.   &else &do
64.        &popup %.pth%noshed.txt
65.   &end
66.   &type Done
67.   &return

1.    /* Name: slect.aml
2.    /*---------------------
```

3.  /* Purpose: /* this aml creates an ascii file of values or names
4.  /*
5.  /*---------------------
6.  /* Calls: None
7.  /*---------------------
8.  /* Called by: fndquad.aml
9.  /*---------------------
10. /* Required variables: .PTH .PTH2 .basn .suff .count .cover .item .subject .nos
11. /*---------------------
12. /* Global variables set: .suff .AREA .A2
13. /*---------------------
14. /* Data created: %.cover%.dat
15. /*---------------------
16. /* Creation Information
17. /* Author: Peter N. Smith, P.E.
18. /* Original coding date: 02/03/95
19. /* Last update: 4/18/95
20. /*---------------------
21. /* Remarks:
22. /*
23. /*---------------------
24. reselect %.cover% poly %.cover%-id > 0
25. &do &while [exists %.cover%.dat]
26.        &type %.cover%.dat already exists.
27.        &sv q = [response 'Overwrite? (Y/N)']
28.        &if %q% = y or %q% = Y &then &do
29.                &sys rm %.cover%.dat
30.        &end
31.        &else &do
32.                &sv new [response 'Enter new name for existing file (no extension)']
33.                &sys mv %.cover%.dat %new%.dat
34.        &end
35. &end
36. &sv unit = [open %.cover%.dat openstat -write]
37. &sv writestat = [WRITE %unit% [quote %.subject% for %.cover%]]
38. &do &while %.count% > 0
39.        &sv a = [show select %.cover% POLY %.count% ITEM %.item%]
40.        &if %.nos% = 1 &then &do
41.                &sv writestat = [WRITE %unit% [quote %.count%, %a%]]
42.                &end
43. &else &do
44.                &sv writestat = [WRITE %unit% [quote %a%]]
45.                &end
46.        &sv .count = %.count% - 1
47.        &end
48. &if %.nos% = 0 &then &do
49.        &sv writestat = [WRITE %unit% end]
50. &end
51. &sv &closestat = [close %unit%]
52. &type The file %.cover%.dat has been created.
53. &return

1.  /* Name: **slect2.aml**
2.  /*---------------------
3.  /* Purpose: this aml creates an ascii file of rainfall values
4.  /*
5.  /*---------------------
6.  /* Calls: None
7.  /*---------------------
8.  /* Called by: dsgnrain.aml

```
9.    /*---------------------
10.   /* Required variables: .PTH .PTH2 .basn .suff .count .cover .item .subject .nos
11.   /*---------------------
12.   /* Global variables set: .suff .AREA .A2
13.   /*---------------------
14.   /* Data created: %.cover%.dat
15.   /*---------------------
16.   /* Creation Information
17.   /* Author: Peter N. Smith, P.E.
18.   /* Original coding date: 02/03/95
19.   /* Last update: 4/18/95
20.   /*---------------------
21.   /* Remarks:
22.   /*
23.   /*---------------------
24.   reselect %.cover% poly %.cover%-id > 0
25.   &do &while [exists %.cover%.dat]
26.         &type %.cover%.dat already exists.
27.         &sv q = [response 'Overwrite? (Y/N)']
28.         &if %q% = y or %q% = Y &then &do
29.                 &sys rm %.cover%.dat
30.         &end
31.         &else &do
32.                 &sv new [response 'Enter new name for existing file (no extension)']
33.                 &sys mv %.cover%.dat %new%.dat
34.         end
35.   &end
36.   &sv unit = [open %.cover%.dat openstat -write]
37.   &sv writestat = [WRITE %unit% [quote %.subject% for %.cover%]]
38.   &do &while %.count% > 0
39.         &sv a = [show select %.cover% POLY %.count% ITEM %.item%]
40.         &if %.nos% = 1 &then &do
41.                 &sv writestat = [WRITE %unit% [quote %.count%, %a%]]
42.         &end
43.         &else &do
44.                 &sv writestat = [WRITE %unit% %a%]
45.         &end
46.         &sv .count = %.count% - 1
47.   &end
48.   &sv &closestat = [close %unit%]
49.   &type The file %.cover%.dat has been created.
50.   &return

1.    /* Name: soilgrp.aml
2.    /*---------------------
3.    /* Purpose: Uses watershed to clip soils coverage and
4.    /* determine percentage of hyd soil group.
5.    /*
6.    /*---------------------
7.    /* Calls: None
8.    /*---------------------
9.    /* Called by: basins.men
10.   /*---------------------
11.   /* Required variables: .PTH .PTH2 .basn .suff
12.   /*---------------------
13.   /* Global variables set:
14.   /*---------------------
15.   /* Data created: %.basn%soil%.suff% %.basn%hydgrp%.suff%
16.   /*---------------------
17.   /* Creation Information
```

18. /* Author: Peter N. Smith, P.E.
19. /* Original coding date: 02/02/95
20. /* Last update: 05/08/95
21. /*---------------------
22. /* Remarks:
23. /*
24. /*---------------------
25. /*
26. &if [exists %.basn%tmp%.suff% -cover] &then &do
27. &sv use = %.basn%tmp%.suff%
28. &sys arc clip %.PTH2%tx/statsgo %use% %.basn%soil%.suff%
29. &sys arc intersect %.basn%soil%.suff% %use% %.basn%hydgrp%.suff%
30. clear
31. mape %.basn%hydgrp%.suff%
32. polygonshades %.basn%hydgrp%.suff% A-PCT
33. polygonshades %.basn%hydgrp%.suff% B-PCT
34. polygonshades %.basn%hydgrp%.suff% C-PCT
35. polygonshades %.basn%hydgrp%.suff% D-PCT
36. &end
37. &else &do
38. &popup %.pth%noshed.txt
39. &end
40. &type Done
41. &return

1. /* Name: **setpth.aml**
2. /*---------------------
3. /* Purpose: This allows the user to override the path to the desired data set
4. /*---------------------
5. /* Calls: none
6. /*---------------------
7. /* Called by: basins.men
8. /*---------------------
9. /* Required variables: None
10. /*---------------------
11. /* Global variables set: .PTH2
12. /*---------------------
13. /* Creation Information
14. /* Author: Peter N. Smith, P.E.
15. /* Original coding date: 5/09/94
16. /* Last update:
17. /*---------------------
18. /* Remarks:
19. /* If the user is running amls from say the cdrom and wishes to use a data set
20. /* on disk (or vice versa), the path to the data may be reset.
21. /*---------------------
22. &sv .oldpth = %.PTH2%
23. &type You may provide a path to your data or hit enter to leave existing path.
24. &type The path should be to the directory above the subdirectory(ies) containing the data.
25. &type For example there are data sets tx and g in /cdrom/thesis.
26. &type The path would be typed as /cdrom/thesis/ not /cdrom/thesis/tx/ nor /cdrom/thesis/g/
27. &type *****Note that you must provide a slash (/) at the end of the path*****
28. &sv .PTH2 = [response 'Enter the full path to your data set. e.g /usr2/psmith/']
29. &if [null %.pth2%] &then &do
30. &sv .pth2 = %.oldpth%
31. &type The data path is still %.pth2%.
32. &type If you wish to change this, please reselect Data/Setpath.
33. &end
34. &else &do
35. &type The data path is now set to %.pth2%.

36.      &type If this is incorrect, please reselect Data/Setpath.
37.      &type You must now select Data/existing to choose your new data set
38.      &type ***Note: If your data set does not show up as an opion under Data/existing
39.      &type you may have typed in the wrong path.
40.    &end
41.    &return

1.    /* Name: **subshed.aml**
2.    /*---------------------
3.    /* Purpose: This AML delineates subareas of a delineated watershed
4.    /* based on a user-defined threshold area and the existence of tributaries.
5.    /* The sub watersheds are delineated as those tributaries
6.    /* having areas in excess of the threshold. The routine
7.    /* calculates each subarea,
8.    /* then accesses path length routines to compute the
9.    /* flowlength of each subarea.
10.   /*---------------------
11.   /* Calls:
12.   /*---------------------
13.   /* Called by: basins.menu
14.   /*---------------------
15.   /* Required variables: .PTH .PTH2 .basn .suff
16.   /*---------------------
17.   /* Global variables set:
18.   /*---------------------
19.   /* Data created: %.basn%tinv%.suff%
20.   /* %.basn%tadd%.suff% %.basn%tadd2%.suff% %.basn%smx%.suff% %.basn%spth%.suff%
21.   /* %.basn%stc%.suff% %.basn%sshed%.suff% %.basn%acc%.suff% %.basn%seg%.suff%
22.   /* %.basn%subas%.suff% %.basn%sub%.suff% %.basn%stc%.suff% outsub
23.   /*
24.   /*---------------------
25.   /* Creation Information
26.   /* Author: Peter N. Smith, P.E.
27.   /* Original coding date: 01/12/94
28.   /* Last update: 5/08/95
29.   /*---------------------
30.   /* Remarks:
31.   /*---------------------
32.   /*
33.   setmask off
34.   &if [exists %.basn%tinv%.suff% -grid] &then kill %.basn%tinv%.suff% all
35.   &if [exists %.basn%tadd%.suff% -grid] &then kill %.basn%tadd%.suff% all
36.   &if [exists %.basn%tadd2%.suff% -grid] &then kill %.basn%tadd2%.suff% all
37.   &if [exists %.basn%smx%.suff% -grid] &then kill %.basn%smx%.suff% all
38.   &if [exists %.basn%spth%.suff% -grid] &then kill %.basn%spth%.suff% all
39.   &if [exists %.basn%stc%.suff% -cover] &then kill %.basn%stc%.suff% all
40.   &if [exists %.basn%sshed%.suff% -grid] &then kill %.basn%sshed%.suff% all
41.   &if [exists %.basn%acc%.suff% -grid] &then kill %.basn%acc%.suff% all
42.   &if [exists %.basn%seg%.suff% -grid] &then kill %.basn%seg%.suff% all
43.   &if [exists %.basn%subas%.suff% -grid] &then kill %.basn%subas%.suff% all
44.   &if [exists %.basn%sub%.suff% -cover] &then kill %.basn%sub%.suff% all
45.   &if [exists %.basn%stc%.suff% -grid] &then kill %.basn%stc%.suff% all
46.   &if [exists outsub -grid] &then kill outsub all
47.   &if [exists %.basn%spp%.suff% -grid] and %.nopps% = 1 &then kill %.basn%spp%.suff% all
48.   /*
49.   &if [exists %.basn%shed%.suff% -grid] or %.outfall% = y &then &do
50.      &if [exists %.basn%pth%.suff% -grid] &then &do
51.         setwindow %.basn%pth%.suff% %.PTH2%%.basn%/.basn%acc
52.      &end
53.      &else &do

```
54.                    &sv .MASK = %.basn%shed%.suff%
55.                    &run %.PTH%winset
56.        &end
57.        /* mask only delineated watershed
58.    /* If only one pour point previously identified, then determine subarea pour
59.    /* points as location of tributary confluences whose area exceeds user-specified
60.    /* threshold
61.        &if %.nopps% = 1 &then &do
62.                    %.basn%acc%.suff% = selectmask (%.PTH2%%.basn%/%.basn%acc, %.basn%shed%.suff%)
63.                    /* Find maximum flowaccumulation for each stream link
64.                    %.basn%seg%.suff% = zonalmax (%.PTH2%%.basn%/%.basn%slnk, %.PTH2%%.basn%/%.basn%acc)
65.                    /* It is possible, but not likely, that two (or more) streamlinks
66.                    /* will have the same max flow accumulation. May add ceck.
67.                    /*
68.                    /* Request threshold area for identification of subarea pour points.
69.                    &popup %.PTH%sublimit.txt
70.                    &sv sublim = [response 'Enter the threshold area (sq.km)']
71.                    /* default to 1 sq.km
72.                    &if [null %sublim%] &then &sv sublim = 1
73.                    /* convert area to no. of cells
74.                    &describe %.basn%seg%.suff%
75.                    &sv thresh = [round [calc 1000000 * %sublim% / %GRD$DX% ** 2]]
76.                    /* locate subarea pour points
77.                    %.basn%ptmp%.suff% = con (%.basn%seg%.suff% == %.basn%acc%.suff% AND ~
78.                    %.basn%acc%.suff% > %thresh%, %.PTH2%%.basn%/%.basn%slnk)
79.                    /* For some reason, this may not include watershed outlet, so ensure this
80.                    /* is included:
81.                    /* Note: Use streamlink here only to force pp's to be numbered consecutively
82.                    /* from 1 upwards. Need to find better way.
83.                    %.basn%spp%.suff% = streamlink (merge (%.basn%ptmp%.suff%, %.basn%pp%.suff%),
       %.PTH2%%.basn%/%.basn%dir)
84.                    &if [exists %.basn%ptmp%.suff% -grid] &then kill %.basn%ptmp%.suff%
85.        &end
86.        /* Delineate subareas
87.        %.basn%sshed%.suff% = watershed ( %.PTH2%%.basn%/%.basn%dir, %.basn%spp%.suff%)
88.        mape %.basn%sshed%.suff%
89.        %.basn%subas%.suff% = int (zonalarea (%.basn%sshed%.suff%))
90.        /* create polygon cov of subsheds
91.        %.basn%sub%.suff% = gridpoly (%.basn%subas%.suff%)
92.        &describe %.basn%sub%.suff%
93.        /* set variables for use in slect.aml (save as ascii file)
94.        &sv .count = [calc %DSC$POLYGONS% - 1]
95.        &sv .nopoly = %.count%
96.        &sv .cover = %.basn%sub%.suff%
97.        &sv .item = grid-code
98.        &sv .subject = Subareas
99.        &sv .nos = 1
100.       &run %.PTH%slect
101.       /* Add suba's as attributes to %.basn%sub%.suff%
102.       &sv .count = %.nopoly%
103.       &if %.nopps% > 1 &then &sv .a2 = 0
104.   &data arc tables
105.   additem %.basn%sub%.suff%.pat Suba(sq.km) 14 14 N 2
106.   additem %.basn%sub%.suff%.pat Wsheda(sq.km) 14 14 N 2
107.   select %.basn%sub%.suff%.pat
108.   calc Suba(sq.km) = grid-code
109.   calc Wsheda(sq.km) = %.A2%
110.   quit
111.   &end
112.       clear
```

113.       mape %.basn%sshed%.suff%
114.       gridpaint %.basn%sshed%.suff%
115.       linecolor 0
116.       arcs %.PTH2%%.basn%/%.basn%sarc
117.       &popup %.basn%sub%.suff%.dat
118.       &popup %.PTH%endsub.txt
119. &end
120. &else
121.       &popup %.PTH%noshed.txt
122. &type Done
123. &return


1.     /* Name: **tcwt2.aml**
2.     /*---------------------
3.     /* Purpose: This aml computes a weighting factor (velocity) for each cell for
4.     /* subsequent computation of time of travel.
5.     /*
6.     /*---------------------
7.     /* Calls: luadj.aml
8.     /*---------------------
9.     /* Called by: tofc.aml
10.     /*---------------------
11.     /* Required variables: .PTH .PTH2 .basn .suff .tc .MASK .TIME
12.     /*---------------------
13.     /* Global variables set:
14.     /*---------------------
15.     /* Data created:  %.basn%tcwt%.suff%
16.     /*---------------------
17.     /* Creation Information
18.     /* Author: Peter N. Smith, P.E.
19.     /* Original coding date: 01/10/95
20.     /* Last update: 4/16/95
21.     /*---------------------
22.     /* Remarks:
23.     /* This routine uses existing or user-modified land use data and cell
24.     /* slope to estimate velocities or overrides with user-defined
25.     /* velocities, or uses a uniformly distributed default surface cover coefficient..
26.     /* Equations derived from TxDOT hydraulic Manual Fig 5 P 2-24, 1985. The general
27.     /* equation is $\log v = 0.5 \log S + b$ (v=velocity, S = slope L/L, b = coefficient
28.     /* dependent on surface cover. (or $v = 10^b \cdot \sqrt{S}$)
29.     /* Cover      b        $10^b$
30.     /*_____
31.     /* Forest    -0.1252    0.7495
32.     /* Fallow    0.151    1.4158
33.     /* short grass    0.3185    2.0821
34.     /* bare    0.4646    2.9147
35.     /* grass waterway 0.6609    4.5804
36.     /* paved    0.7335    5.4138
37.     /* weight = 1/velocity = $1/10^{(0.5 \log S + b)}$ (TxDOT / SCS) then t = length * wt
38.     /*---------------------
39.     &sv .q1 [response 'Do you want to use land use/ velocity coefficient data? (y or n)']
40.     &if %.q1% = Y or %.q1% = y &then &sv .q = y
41.     &else &sv .q = n
42.     &sv q2 [response 'Do you want to specify velocities? (y or n)']
43.     &if %q2% = Y or %q2% = y &then &run %.pth%luadj.aml
44.     &sv b = 4.5804 /* metric
45.     /*
46.     &if [exists %.basn%vel%.suff% -grid] and [exists %.basn%lugrd%.suff% -grid] and %.q% = y &then &do
47.     /* assign user defined velocity as inverse weight if provided, otherwise use existing land use and
48.     /* associated velocity coefficient

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49.    DOCELL
50.    if (%.PTH2%%.basn%/%.basn%slope > 0.3) %.basn%tctmp%.suff% = 1 DIV (SQRT (%.PTH2%%.basn%/%.basn%slope
      DIV 100) * %.basn%lugrd%.suff%.vcoeff)
51.    else %.basn%tctmp%.suff% = 1 DIV (SQRT (.003) * %.basn%lugrd%.suff%.vcoeff)
52.    END
53.    %.basn%tcwt%.suff% = merge (1 / %.basn%vel%.suff%, %.basn%tctmp%.suff%)
54.    &if [exists %.basn%tcwt%.suff% -grid] &then kill %.basn%tctmp%.suff% all
55. /*
56. &end
57. &else &do
58.    /* use existing grid of velocity coeffs (10^b) - not currently user-definable
59.    /* but could modify luadj.aml to incorporate.
60.    &if [exists %.basn%b10%.suff% -grid] &then &do
61.            DOCELL
62.            if (%.PTH2%%.basn%/%.basn%slope > 0.3) %.basn%tcwt%.suff% = 1 DIV (SQRT
      (%.PTH2%%.basn%/%.basn%slope DIV 100) * %.basn%b10%.suff%)
63.            else %.basn%tcwt%.suff% = 1 DIV (SQRT (.003) * %.basn%b10%.suff%)
64.            END
65.    &end
66.    &else &do
67.            /* use default cover (grassed waterway) and user-defined velocities
68.            &if [exists %.basn%vel%.suff% -grid] &then &do
69.                    DOCELL
70.                    if (%.PTH2%%.basn%/%.basn%slope > 0.3) %.basn%tctmp%.suff% = 1 DIV (SQRT
      (%.PTH2%%.basn%/%.basn%slope DIV 100) * %b%)
71.                    else %.basn%tctmp%.suff% = 1 DIV (SQRT (.003) * %b%)
72.                    END
73.                    %.basn%tcwt%.suff% = merge (1 / %.basn%vel%.suff%, %.basn%tctmp%.suff%)
74.                    &if [exists %.basn%tcwt%.suff% -grid] &then kill %.basn%tctmp%.suff% all
75.            &end
76.    &end
77. &end
78. &if %.q1% = n and %q2% = n &then &do
79.    /* Just use default cover velocity coefficient
80.    DOCELL
81.    if (%.PTH2%%.basn%/%.basn%slope > 0.3) %.basn%tcwt%.suff% = 1 DIV (SQRT (%.PTH2%%.basn%/%.basn%slope
      DIV 100) * %b%)
82.    else %.basn%tcwt%.suff% = 1 DIV (SQRT (.003) * %b%)
83.    END
84. &end
85. &return


1.  /* Name: **tofc.aml**
2.  /*---------------------
3.  /* Purpose: Determines the time of concentration and time path from
4.  /* watershed boundary to outfall and individual subarea pour points
5.  /* if subareas has been run.
6.  /*
7.  /*---------------------
8.  /* Calls: winset.aml tcwt2.aml
9.  /*---------------------
10. /* Called by: basins.menu
11. /*---------------------
12. /* Required variables: .PTH .PTH2 .basn .suff .tc .MASK .TIME
13. /*---------------------
14. /* Global variables set: .tc .MASK .TIME
15. /*---------------------
16. /* Data created:  %.basn%tup%.suff% %.basn%tdn%.suff% %.basn%tc%.suff%
17. /* %.basn%tptharc%.suff% %.basn%tpth%.suff%
18. /*---------------------

```
19.    /* Creation Information
20.    /* Author: Peter N. Smith, P.E.
21.    /* Original coding date: 01/10/95
22.    /* Last update: 4/16/95
23.    /*---------------------
24.    /* Remarks:
25.    /* Adds resulting time to watershed attribute table or subarea attribute table
26.    /* Dummy variable currently used to describe surface roughness in rcns.dat
27.    /*---------------------
28.    /*
29.    /* The time of concentration is calculated using the flowlength function
30.    /* using a weight value calculated in tcwt.aml. It is necessary to run
31.    /* flowlength upstream and downstream, not to get the total time but to
32.    /* establish the path(s) similar to pthleng.aml.
33.    /* Ensure that watershed coverage exists
34.    &if [exists %.basn%tup%.suff% -grid] &then kill %.basn%tup%.suff%
35.    &if [exists %.basn%tdn%.suff% -grid] &then kill %.basn%tdn%.suff%
36.    &if [exists %.basn%tcwt%.suff% -grid] &then kill %.basn%tcwt%.suff%
37.    &if [exists %.basn%tc%.suff% -grid] &then kill %.basn%tc%.suff%
38.    &if [exists %.basn%tpth%.suff% -grid] &then kill %.basn%tpth%.suff%
39.    &if [exists %.basn%tptharc%.suff% -cover] &then kill %.basn%tptharc%.suff%
40.    &if [exists %.basn%shed%.suff% -grid] &then &do
41.         &type 'Be patient, this might take a while!'
42.    /* If already run pathlength set analysis window to pathlength coverage otherwise run winset to reduce analysis
43.    /* window.
44.         &if not [exists %.basn%pth%.suff% -grid] &then &do
45.                   &sv .MASK = %.basn%shed%.suff%
46.                   &run %.PTH%winset.aml
47.         &end
48.         &else setwindow %.basn%pth%.suff%
49.         setmask %.basn%shed%.suff%
50.         /* calculate weights (1/velocity for each cell)
51.         &run %.PTH%tcwt2.aml
52.         &sv .tc = [exists %.basn%tcwt%.suff% -grid]
53.         setmask off
54.         /* Since the weight is 1/velocity, can calculate time of travel per cell
55.         /* as length /velocity i.e. length * weight
56.         /* Only an upstream run is required to determine total time but
57.         /* need downstream to help determine path as in pthleng.aml
58.         %.basn%tup%.suff% = flowlength ( selectmask (%.PTH2%%.basn%/%.basn%dir, %.basn%shed%.suff%),
    %.basn%tcwt%.suff%, UPSTREAM)
59.         %.basn%tdn%.suff% = flowlength ( selectmask (%.PTH2%%.basn%/%.basn%dir, %.basn%shed%.suff%),
    %.basn%tcwt%.suff%, DOWNSTREAM)
60.         &type 'Computing time of concentraction...'
61.         /* Total travel time is maximum value in %.basn%tup%.suff%
62.         %.basn%tc%.suff% = ZONALMAX (%.basn%shed%.suff%, ~
63.         %.basn%tup%.suff%)
64.         &describe %.basn%tc%.suff%
65.         /* calculate time in mins
66.         &sv .TIME = [round [calc %GRD$ZMAX% / 60]]
67.         /* Similar to pthleng.aml, find path as being those cells whose up and down
68.         /* lengths summate to the maximum time.
69.         /*
70.         %.basn%tpth%.suff% = con (%.basn%tup%.suff% + %.basn%tdn%.suff% ~
71.         > %.basn%tc%.suff% ~
72.         - %.basn%shed%.suff%, 1)
73.         /* convert to vector coverage for display
74.         %.basn%tptharc%.suff% = gridline (%.basn%tpth%.suff%)
75.         &type The time of concentration is %.TIME% minutes
76.         /* Add calculated time of concentration as attribute of polygon coverage
```

```
77.    &data arc tables
78.    additem %.basn%tmp%.suff%.pat T_of_C(mins) 10 10 N
79.    select %.basn%tmp%.suff%.pat
80.    reselect $recno = 2
81.    calc T_of_C(mins) = %.TIME%
82.    quit
83.    &end
84.           linecolor 0
85.           arcs %.basn%tptharc%.suff%
86.           &if [exists %.basn%subas%.suff% -grid] &then &do
87.                   /* Note: Actual times already computed if tofc for whole watershed computed
88.                   /* just need to abstract times and calculate differences
89.                   /* from tofc grid at pour points.
90.                   &type 'Determining times of concentration for subareas...'
91.                   setwindow %.basn%spp%.suff%
92.                   /* create inverse of main time path
93.                   %.basn%tinv%.suff% = isnull (%.basn%tpth%.suff%)
94.                   /* add up and down times (should have done in Time of travel routine!)
95.                   %.basn%tadd%.suff% = %.basn%tup%.suff% + %.basn%tdn%.suff%
96.                   /* eliminate times associated with main path
97.                   %.basn%tadd2%.suff% = selectmask (%.basn%tadd%.suff%, %.basn%tinv%.suff%)
98.                   /* Find remaining maximum times in each subarea. These are t's from each subarea
99.                   /* to the outfall!
100.                  %.basn%smx%.suff% = zonalmax (%.basn%sshed%.suff%, %.basn%tdn%.suff%)
101.                  /* Find subarea paths using value of subwatershed as id
102.                  %.basn%spth%.suff% = con (%.basn%tadd2%.suff% > %.basn%smx%.suff% - 1, %.basn%sshed%.suff%)
103.                  /* now need to determine subarea tc's as difference between max times per subarea
104.                  /* and time from outfall to subarea pourpoint.
105.                  %.basn%stc%.suff% = int (zonalrange (%.basn%spth%.suff%, %.basn%tdn%.suff%))
106.                  /* convert subarea paths to vector
107.                  %.basn%sptharc%.suff% = gridline (%.basn%spth%.suff%, #, #, #, #, value)
108.                  /* join values of time w/ subareas
109.                  &if [exists %.basn%stc%.suff% -grid] &then &do
110.   &data arc tables
111.   select %.basn%stc%.suff%.vat
112.   alter value
113.   SubTC(min)
114.
115.
116.
117.   select %.basn%subas%.suff%.vat
118.   alter value
119.
120.
121.
122.   Suba(sq.km)
123.   quit
124.   &end
125.                                  &sys arc joinitem %.basn%subas%.suff%.vat %.basn%stc%.suff%.vat %.basn%subas%.suff%.vat
           $recno value
126.                                  &sys arc joinitem %.basn%sub%.suff%.pat %.basn%subas%.suff%.vat %.basn%sub%.suff%.pat
           Suba(sq.km) Wsheda(sq.km)
127.   &data arc tables
128.   select %.basn%sub%.suff%.pat
129.   calc Suba(sq.km) = grid-code / 1000000
130.   calc SubTC(min) = SubTC(min) / 60
131.   quit
132.   &end
133.                   &end
134.       &end
```

135.        &popup %.PTH%tcend.txt
136.   &end
137.   &else &popup %.PTH%noshed.txt
138.   &type Done
139.   &return

**upscale.aml**
1.     /* This AML is intended to use the 500m delineated area to
2.     /* change to 90m or 30 m resolution for which processed coverages
3.     /* already exist.
4.     setmask off
5.     &if [exists %.basn%shed%.suff% -grid] &then &do
6.     &sv .old = %.basn%
7.     &sv .basn = [response 'enter the prefix for the higher resolution data']
8.     /* Use existing extent of pathlength or find extent of existing shed to
9.     /* limit analysis area. (May need to increase tolerance in winset.aml)
10.    &if [exists %.PTH2%%.basn%/%.basn%dir -grid] &then &do
11.    &if [exists %.old%pth%.suff%] &then &do
12.    setwindow %.old%pth%.suff% %.pth2%%.basn%/%.basn%acc
13.    mape %.old%pth%.suff%
14.    &end
15.    &else &do
16.    setwindow %.old%shed%.suff% %.pth2%%.basn%/%.basn%acc
17.    mape %.old%shed%.suff%
18.    &end
19.    /*establish pour point at higher resolution
20.    /* Once highway and stream names are added to coverages, should be able to
21.    /* use to automatically determine outfall location at higher resolution
22.    &describe %.PTH2%%.basn%/%.basn%bas
23.    setcell %GRD$DX%
24.    searchtolerance [calc %GRD$DX% * 4]
25.    &sv .upsc = Y
26.    &popup %.PTH%upscale.txt
27.    clear
28.    gridshades %.PTH2%%.basn%/%.basn%bas
29.    linecolor 3
30.    arcs %.PTH2%%.basn%/%.basn%rds
31.    linecolor 5
32.    arcs %.PTH2%%.basn%/%.basn%sarc
33.    &end
34.    &else &do
35.    &type The data sets for %.PTH2%%.basn%/%.basn% do no exist.
36.    &type Please reselect the Scale option and enter a valid data set name
37.    &type or run preprocess
38.    &sv .basn = %.old%
39.    &end
40.    &end
41.    &else &do
42.    &popup %.PTH%noscale.txt
43.    &end
44.    &return

1.     /* Name: **usgs.aml**
2.     /*----------------------
3.     /* Purpose:
4.     /* This aml sets up input records for the HYDRO routine in THYSYS
5.     /* for regression equations. The area, slope, region and rainfall
6.     /* are taken from the current watershed analysis. The calculated discharges
7.     /* are then added to the watershed PAT
8.     /* All units are metric

```
9.    /*--------------------
10.   /* Calls: None
11.   /*--------------------
12.   /* Called by: basins.menu
13.   /*--------------------
14.   /* Required variables: .PTH .PTH2 .basn .suff
15.   /*--------------------
16.   /* Global variables set:
17.   /*--------------------
18.   /* Data created: thys.dat thys.lis
19.   /*--------------------
20.   /* Creation Information
21.   /* Author: Peter N. Smith, P.E.
22.   /* Original coding date: 02/20/94
23.   /* Last update: 5/8/95
24.   /*--------------------
25.   /* Remarks:
26.   /*
27.   /*--------------------
28.   &if [exists %.basn%tmp%.suff% -cover] &then &do
29.       &sv job = [response 'Please give upto a four character id for this job.']
30.       &if [exists %job%.dat] &then &do
31.           &type The file %job%.dat already exists.
32.           &sv quest = [response 'Do you want to overwrite? (YES or N)']
33.           &if %quest% = YES &then &do
34.               &type Overwriting %job%.dat...
35.           &end
36.           &else &do &while [exists %job%.dat]
37.               &sv job = [response 'Please give a new name four character id for this job.']
38.           &end
39.       &end
40.       &sv title = [response 'Please enter a job title']
41.       &sv unit = [open thys.dat openstat -write]
42.       &sv writestat = [WRITE %unit% [quote JOB %job% "%title%" I=M O=M]]
43.       &sv writestat = [WRITE %unit% [quote FREQ %job% 2, 5, 10, 25, 50, 100]]
44.       &sv writestat = [WRITE %unit% [quote REG %job% %.rgn%, %.AREA%, %.SLOPE%]]
45.       &sv &closestat = [close %unit%]
46.       &type The file thys.dat has been created.
47.       &sv GO = [response 'Do you want to run THYSYS now? (Yor N)']
48.       &if %GO% = Y OR %GO% = y &then &do
49.           /* Run Thysys then come back
50.           &sys mv thys.dat /usr2/psmith/thysys
51.           &sys /usr2/psmith/thysys/thys thys.dat
52.           &popup thys.lis
53.       &end
54.   /*&return
55.       /* add results to watershed PAT
56.       /* open and read thysys output file
57.           &type 1
58.           &sv unit = [open thys.lis openstat -read]
59.           &if %openstat% = 0 &then &do
60.               &sv count = 1
61.               &sv blank = [read %unit% readstat]
62.               &do &until %count% = 21
63.                   &sv qs = [read %unit% readstat]
64.                   &sv count = %count% + 1
65.               &end
66.               &sv .no = %count% - 1
67.               &sv closestat = [close %unit%]
68.               &if %closestat% = 0 &then
```

69.                             &type File closed
70.             &end
71.   &type %qs%
72.   &data arc tables
73.   additem %.basn%tmp%.suff%.pat Q2 10 10 N 2
74.   additem %.basn%tmp%.suff%.pat Q5 10 10 N 2
75.   additem %.basn%tmp%.suff%.pat Q10 10 10 N 2
76.   additem %.basn%tmp%.suff%.pat Q25 10 10 N 2
77.   additem %.basn%tmp%.suff%.pat Q50 10 10 N 2
78.   additem %.basn%tmp%.suff%.pat Q100 10 10 N 2
79.   select %.basn%tmp%.suff%.pat
80.   reselect $recno = 2
81.   calc Q2 = [extract 3 [unquote %qs%]]
82.   calc Q5 = [extract 4 [unquote %qs%]]
83.   calc Q10 = [extract 5 [unquote %qs%]]
84.   calc Q25 = [extract 6 [unquote %qs%]]
85.   calc Q50 = [extract 7 [unquote %qs%]]
86.   calc Q100 = [extract 8 [unquote %qs%]]
87.   quit
88.   &end
89.   &end
90.   &else &do
91.      &popup %.pth%noshed.txt
92.   &end
93.   &type Done
94.   &return

1.   /* Name: **uslope.aml**
2.   /*----------------------
3.   /* Purpose:
4.   /* This aml computes the average watershed slope (USGS) using txfil,
5.   /* %.basn%up%.suff%, %.basn%pth%.suff%,
6.   /* note: if %.basn%pth%.suff% changed in tofc.aml to represent time path
7.   /* rather than longest distance, then need to compute longest distance path
8.   /* and use instead. Also uses wshed to determine usgs region number from gsrgns.
9.   /*
10.   /*----------------------
11.   /* Calls: None
12.   /*----------------------
13.   /* Called by: basins.menu
14.   /*----------------------
15.   /* Required variables: .PTH .PTH2 .basn .suff
16.   /*----------------------
17.   /* Global variables set:
18.   /*----------------------
19.   /* Data created:
20.   /*----------------------
21.   /* Creation Information
22.   /* Author: Peter N. Smith, P.E.
23.   /* Original coding date: 12/03/94
24.   /* Last update: 4/4/95
25.   /*----------------------
26.   /* Remarks:
27.   /*
28.   /*----------------------
29.   &if [exists %.basn%strng%.suff%] &then kill %.basn%strng%.suff% /* temporary
30.   &if [exists %.basn%l84%.suff%] &then kill %.basn%l84%.suff% /* temporary
31.   &if [exists %.basn%l10%.suff%] &then kill %.basn%l10%.suff% /* temporary
32.   &if [exists E85%.suff%] &then kill E85%.suff% /* temporary
33.   &if [exists E10%.suff%] &then kill E10%.suff% /* temporary

```
34.   &if [exists %.basn%rgn%.suff%] &then kill %.basn%rgn%.suff% /* temporary
35.   &if [exists %.basn%pth%.suff% -grid] &then &do
36.   &messages &off
37.   &type Determining average slope, please wait.
38.   %.basn%strng%.suff% = selectmask (%.basn%up%.suff%, %.basn%pth%.suff%)
39.   &describe %.basn%strng%.suff%
40.   &sv wl85 = [calc %GRD$ZMAX% * 0.15]
41.   &sv wl10 = [calc %GRD$ZMAX% * 0.90]
42.   /* might want to check to see if there is a "nearest" function otherwise locate
43.   /* cells in path which include 85% & 10% points as follows
44.   &sv cs = [sqrt [calc %GRD$DX% ** 2 * 2]] / 2
45.   %.basn%l85%.suff% = con (%.basn%strng%.suff% > %wl85% - %cs% & ~
46.   %.basn%strng%.suff% < %wl85% + %cs%, %.basn%strng%.suff%)
47.   &describe %.basn%l85%.suff%
48.   &sv LUP = %GRD$ZMAX%
49.   %.basn%l10%.suff% = con (%.basn%strng%.suff% > %wl10% - %cs% & ~
50.   %.basn%strng%.suff% < %wl10% + %cs%, %.basn%strng%.suff%)
51.   &describe %.basn%l10%.suff%
52.   &sv LDOWN = %GRD$ZMAX%
53.   E85%.suff% = selectmask (%.PTH2%%.basn%/%.basn%fil, %.basn%l85%.suff%)
54.   &describe E85%.suff%
55.   &sv EUP = %GRD$ZMAX%
56.   E10%.suff% = selectmask (%.PTH2%%.basn%/%.basn%fil, %.basn%l10%.suff%)
57.   &describe E10%.suff%
58.   &sv EDOWN = %GRD$ZMAX%
59.   &sv .SLOPE = [calc [calc %EUP% - %EDOWN%] / [calc %LDOWN% - %LUP%]] * 1000
60.   &format 1
61.   &type [format 'The average watershed slope is %1% m/km' %.SLOPE%]
62.   /* Find region for USGS regression equations (Texas rural only)
63.   &type Determining current USGS region in which watershed is located
64.   &sys arc clip %.pth2%tx/gsrgns %.basn%tmp%.suff% %.basn%rgn%.suff%
65.   &data arc tables
66.   additem %.basn%rgn%.suff%.pat tota 10 10 n 2
67.   additem %.basn%rgn%.suff%.pat pct_a 7 7 n 2
68.   select %.basn%rgn%.suff%.pat
69.   reselect %.basn%rgn%.suff%# > 1
70.   /* pct-a may not add to exactly 100 because of conversion from grid
71.   /* could use bounding polygon area instead.
72.   calc tota = %.a2%
73.   calc pct_a = area / 1000000 / tota * 100
74.   quit
75.   &end
76.   /* Note: could have area in more than one region
77.   /* For the moment, take one region
78.   reselect %.basn%rgn%.suff%.pat info %.basn%rgn%.suff%# = 2
79.   &sv .rgn = [show select %.basn%rgn%.suff%.pat info 1 ITEM region#]
80.   &type The USGS region is %.rgn%
81.   /* add the region id to watershed atttribute table
82.   &data arc tables
83.   additem %.basn%tmp%.suff%.pat Region# 3 3 i
84.   select %.basn%tmp%.suff%.pat
85.   calc Region# = %.rgn%
86.   quit
87.   &end
88.   &goto skip
89.   /* find how many polys
90.   &describe %.basn%rgn%.suff%
91.   &sv count = %dsc$polygons%
92.   /* Select each record in turn and save percent area in region
93.   &do &while %count% > 1
```

```
94.          reselect %.basn%rgn%.suff%.pat info item region# = 1
95.          &sv count2 = [show number select]
96.          &sv rgn1_pct
97.          &do &while %count2% > 0
98.                  &sv rgn1_pct = rgn1_pct + [show select %.basn%rgn%.suff%.pat info %count2% pct_a]
99.                  &sv count2 = %count2% - 1
100.         &end
101.         reselect %.basn%rgn%.suff%.pat info item region# = 2
102.         &sv count2 = [show number select]
103.         &sv rgn2_pct
104.         &do &while %count2% > 0
105.                 &sv rgn2_pct = rgn2_pct + [show select %.basn%rgn%.suff%.pat info %count2% pct_a]
106.                 &sv count2 = %count2% - 1
107.         &end
108.         reselect %.basn%rgn%.suff%.pat info item region# = 3
109.         &sv count2 = [show number select]
110.         &sv rgn3_pct
111.         &do &while %count2% > 0
112.                 &sv rgn3_pct = rgn3_pct + [show select %.basn%rgn%.suff%.pat info %count2% pct_a]
113.                 &sv count2 = %count2% - 1
114.         &end
115.         reselect %.basn%rgn%.suff%.pat info item region# = 4
116.         &sv count2 = [show number select]
117.         &sv rgn4_pct
118.         &do &while %count2% > 0
119.                 &sv rgn4_pct = rgn4_pct + [show select %.basn%rgn%.suff%.pat info %count2% pct_a]
120.                 &sv count2 = %count2% - 1
121.         &end
122.         reselect %.basn%rgn%.suff%.pat info item region# = 5
123.         &sv count2 = [show number select]
124.         &sv rgn5_pct
125.         &do &while %count2% > 0
126.                 &sv rgn5_pct = rgn5_pct + [show select %.basn%rgn%.suff%.pat info %count2% pct_a]
127.                 &sv count2 = %count2% - 1
128.         &end
129.         reselect %.basn%rgn%.suff%.pat info item region# = 6
130.         &sv count2 = [show number select]
131.         &sv rgn6_pct
132.         &do &while %count2% > 0
133.                 &sv rgn6_pct = rgn6_pct + [show select %.basn%rgn%.suff%.pat info %count2% pct_a]
134.                 &sv count2 = %count2% - 1
135.         &end
136. &end
137. /* Add info to watershed table %.basn%tmp%.suff%.pat
138. additem %.basn%tmp%.suff%.pat rgn1_pct 5 5 n 2
139. additem %.basn%tmp%.suff%.pat rgn2_pct 5 5 n 2
140. additem %.basn%tmp%.suff%.pat rgn3_pct 5 5 n 2
141. additem %.basn%tmp%.suff%.pat rgn4_pct 5 5 n 2
142. additem %.basn%tmp%.suff%.pat rgn5_pct 5 5 n 2
143. additem %.basn%tmp%.suff%.pat rgn6_pct 5 5 n 2
144. select %.basn%tmp%.suff%.pat
145. &label skip
146. &if [exists %.basn%strng%.suff% -grid] &then kill %.basn%strng%.suff%
147. &if [exists %.basn%l85%.suff% -grid] &then kill %.basn%l85%.suff%
148. &if [exists %.basn%l10%.suff% -grid] &then kill %.basn%l10%.suff%
149. &if [exists E85%.suff% -grid] &then kill E85%.suff%
150. &if [exists E10%.suff% -grid] &then kill E10%.suff%
151. &popup %.PTH%slpend.txt
152. &end
153. &else &type You need to run pathlength first!
```

154. &type Done
155. &return


1. /* Name: **velpoly.aml**
2. /*---------------------
3. /* Purpose: Draw polygons to create a grid of velocity values for
4. /* subsequent estimation of time of concentration.
5. /*
6. /*---------------------
7. /* Calls: none
8. /*---------------------
9. /* Called by: lu.menu
10. /*---------------------
11. /* Required variables: .PTH .PTH2 .basn .suff
12. /*---------------------
13. /* Global variables set:
14. /*---------------------
15. /* Creation Information
16. /* Author: Peter N. Smith, P.E.
17. /* Original coding date: 04/12/95
18. /* Last update:
19. /*---------------------
20. /* Remarks: The value assigned should be in m/s and will override surface
21. /* cover coefficients. This is usually aplicable to stream reaches or areas of
22. /* concentrated flow.
23. /*---------------------
24. /*
25. /*
26. &if NOT [null %.vel%] &then &do
27.         setmask off
28.         &popup %.pth%poly.txt
29.         &sv count = 1
30.         &sv .merge =
31.         &do &until %more% = y or %more% = Y
32.                 v%count% = selectpolygon (%.basn%shed%.suff%, *) * %.vel%
33. /* the following is merely to overcome a problem in grid which
34. /* otherwise does not allow sequential drawing of polys. Drawing any
35. /* other grid or arc will avoid the problem!
36.                 arcs  %.basn%tmp%.suff%
37.                 &sv more = [response 'Finished? (y)']
38.                 &sv .merge = %.merge%v%count%,
39.                 &sv count = %count% + 1
40.         &end
41.         &sv count = %count% - 1
42.         &sv merge = [trim %.merge% -right ,]
43.         %.basn%v%.suff% = merge (%merge%)
44.         /*&dv .merge
45.         &do &until %count% = 0
46.                 &if [exists v%count% -grid] &then kill v%count% all
47.                 &sv count = %count% - 1
48.         &end
49.         &if [exists %.basn%vel%.suff% -grid] &then &do
50.                 vtmp = merge (%.basn%v%.suff%, %.basn%vel%.suff%)
51.                 &if [exists %.basn%vel%.suff% -grid] &then kill %.basn%vel%.suff% all
52.                 &if [exists %.basn%v%.suff% -grid] &then kill %.basn%v%.suff% all
53.                 %.basn%vel%.suff% = vtmp
54.                 &if [exists vtmp -grid] &then kill vtmp all
55.         &end
56.         &else &do
57.                 %.basn%vel%.suff% = %.basn%v%.suff%

58. &if [exists %.basn%v%.suff% -grid] &then kill %.basn%v%.suff% all
59. &end
60. arcs %.basn%tmp%.suff%
61. &end
62. &else &popup %.pth%nov.txt
63. &type Done
64. &return


1. /* Name: **winset.aml**
2. /*----------------------
3. /* Purpose: This AML sets a window automatically to accommodate the largest extent
4. /* of an input coverage. This helps reduce processing time and replaces
5. /* a user-defined window.
6. /*
7. /*----------------------
8. /* Calls: None
9. /*----------------------
10. /* Called by: tofc.aml and pthleng.aml, subshed.aml
11. /*----------------------
12. /* Required variables: .PTH .PTH2 .basn .suff
13. /*----------------------
14. /* Global variables set: .mask
15. /*----------------------
16. /* Data created: %.basn%pp%.suff% %.basn%shed%.suff% %.basn%tmp%.suff%
17. /*----------------------
18. /* Creation Information
19. /* Author: Peter N. Smith, P.E.
20. /* Original coding date: 12/26/94
21. /* Last update: 5/8/95
22. /*----------------------
23. /* Remarks: The grid accuracy may be a problem here
24. /*
25. /*----------------------
26. /*
27. /* Use the cell size of the grid with which a window is being set
28. setcell %.MASK%
29. setwindow %.MASK%
30. &sv tst [exists xcell%.suff% -grid]
31. &sv tst1 [exists ycell%.suff% -grid]
32. &if %tst%%tst1% = .FALSE..FALSE. &then &do
33. xcell%.suff% = selectmask ($$wx0 + $$cellsize * (0.5 + $$colmap), %.MASK%)
34. ycell%.suff% = selectmask ($$wy1 - $$cellsize * (0.5 + $$rowmap), %.MASK%)
35. &end
36. &describe xcell%.suff%
37. &sv .xmin = [calc %GRD$ZMIN% - %GRD$DX% * 2]
38. &sv .xmax = [calc %GRD$ZMAX% + %GRD$DX% * 2]
39. &describe ycell%.suff%
40. &sv .ymin = [calc %GRD$ZMIN% - %GRD$DY% * 2]
41. &sv .ymax = [calc %GRD$ZMAX% + %GRD$DY% * 2]
42. /* set the window to two cells larger than the extent of the watershed
43. /* and snap to cells of flow accumulation grid to keep resulting grids
44. /* coincident
45. setwindow %.xmin% %.ymin% %.xmax% %.ymax% %.pth2%%.basn%/%.basn%acc
46. &return


1. /* Name: **wshape**.aml
2. /*----------------------
3. /* Purpose: This aml calculates a watershed shape factor as being
4. /* the area divided by path length squared.
5. /*

```
6.    /*----------------------
7.    /* Calls: None
8.    /*----------------------
9.    /* Called by: basins.menu
10.   /*----------------------
11.   /* Required variables: .PTH .PTH2 .basn .suff
12.   /*----------------------
13.   /* Global variables set: .sfac
14.   /*----------------------
15.   /* Data created: Shape factor added to Watershed PAT
16.   /*----------------------
17.   /* Creation Information
18.   /* Author: Peter N. Smith, P.E.
19.   /* Original coding date: 01/20/95
20.   /* Last update:
21.   /*----------------------
22.   /* Remarks:
23.   /*
24.   /*----------------------
25.   &if [exists %.basn%pth%.suff% -grid] &then &do
26.        &type %.AREA% %.a2% %.length%
27.        &sv fac =  1000 * %.A2% / [calc %.LENGTH% ** 2 ]
28.        &sv .sfac = [round %fac%] / 1000
29.        &type The shape factor is calculated to be %.sfac%
30.        /* Add shape factor as attribute of polygon coverage
31.   &data arc tables
32.   additem %.basn%tmp%.suff%.pat Shape_fac 10 10 N 7
33.   select %.basn%tmp%.suff%.pat
34.   reselect $recno = 2
35.   calc Shape_fac = %.sfac%
36.   quit
37.   &end
38.   &end
39.   &else &type You need to run Watershed/Pathlength first!
40.   &type Done
41.   &return


1.    /* Name: wshed.aml
2.    /*----------------------
3.    /* Purpose: This aml uses the identified highway and stream, selected cell, user-specified pour
4.    /* point coverage, or drawn line to locate the watershed outfall (pour point).
5.    /* Then determines the watershed boundary and drainage area to the outfall.
6.    /*
7.    /* Note: need to modify area calcs to accommodate different scales.
8.    /*
9.    /*----------------------
10.   /* Calls: None
11.   /*----------------------
12.   /* Called by: basins.men
13.   /*----------------------
14.   /* Required variables: .PTH .PTH2 .basn .suff .upsc .outfall .rdid .strmid
15.   /*----------------------
16.   /* Global variables set: .suff .AREA .A2
17.   /*----------------------
18.   /* Data created: %.basn%pp%.suff% %.basn%shed%.suff% %.basn%tmp%.suff%
19.   /*----------------------
20.   /* Creation Information
21.   /* Author: Peter N. Smith, P.E.
22.   /* Original coding date: 12/03/94
23.   /* Last update: 4/12/95
```

```
24.    /*----------------------
25.    /* Remarks:
26.    /*
27.    /*----------------------
28.    setmask off
29.    &messages &off
30.    &if %.outfall% = n &then &do
31.    /*  Using roads and stream to find outfall
32.         /* ensure that outfall can be located
33.         &if [null %.strmid%] and [null %.rdid%] &then &type Please identify your highway and stream first
34.         &if [null %.strmid%] and [null %.rdid%] &then &goto jump
35.         &sv .suff = [response 'Enter the suffix for your proposed data sets']
36.         &if [exists ycell%.suff% -grid] &then kill ycell%.suff% all
37.         &if [exists xcell%.suff% -grid] &then kill xcell%.suff% all
38.         &do &while [exists %.basn%pp%.suff% -grid]
39.              &type %.basn%pp%.suff% 'and/or' %.basn%shed%.suff% already exist
40.              &sv .suff = [response 'Please enter a new suffix e.g. b or c or bb etc...']
41.         &end
42.         /* If no window set, request user to set analysis window
43.         /* This step could be precluded by use of HUC coverages to automatically
44.         /* reduce analysis window, but requires much more programming for little benefit!
45.         &if [null %.upsc%] &then &do
46.              &popup %.PTH%selw.txt
47.              setwindow * %.PTH2%%.basn%/%.basn%acc
48.         &end
49.         /* Find outlet as being intersection of selected road and stream.
50.         /* Note: Preprocessor creates vector and grid coverage of streams and
51.         /* highways with vector id's matching cell values.
52.         &type 'Determining pour point...'
53.         %.basn%pp%.suff% = con (%.PTH2%%.basn%/%.basn%rdgrd == %.rdid% & %.PTH2%%.basn%/%.basn%slnk ==
       %.strmid%, 1)
54.    &end
55.    &if %.nopps% < 2 &then &do
56.         &sv .outfall = n
57.    /* Delineate watershed using predetermined direction grid and pour point grid.
58.         &type 'Delineating watershed...'
59.         %.basn%shed%.suff% = WATERSHED (%.PTH2%%.basn%/%.basn%dir, %.basn%pp%.suff%)
60.         &type 'Calculating drainage area...'
61.         /* Temporarily using two methods to determine area
62.         /* 1. Find flow accumulation at pour point and add one cell area to include pour point.
63.         %.basn%d%.suff% = con (%.basn%pp%.suff% == 1, %.PTH2%%.basn%/%.basn%acc)
64.         &describe %.basn%d%.suff%
65.         &sv .AREA = [calc %GRD$DX% * %GRD$DY% * ( %GRD$ZMAX% + 1 ) / 1000000]
66.         /* 2. Summate cells in zone
67.         %.basn%da%.suff% = zonalarea (%.basn%shed%.suff%) / 1000000
68.         &describe %.basn%da%.suff%
69.         &sv .A2 = %GRD$ZMAX%
70.         &type 'The drainage area of' %.basn%shed%.suff% 'is' %.AREA% sq. km.'
71.         &type 'The zonal area of' %.basn%shed%.suff% 'is' %.A2% sq. km.'
72.         &type Creating polygon coverage of watershed
73.         /* convert grid of watershed into polygon coverage for display and assignment of attributes.
74.         %.basn%tmp%.suff% = gridpoly (%.basn%shed%.suff%)
75.         /* draw resulting watershed on top of existing coverages
76.         &if [null %.upsc%] &then
77.              mape %.PTH2%%.basn%/%.basn%bas
78.         linecolor 1
79.         arcs %.PTH2%%.basn%/%.basn%sarc
80.         linecolor 3
81.         arcs %.PTH2%%.basn%/%.basn%rds
82.         linecolor 0
```

```
83.        arcs %.basn%tmp%.suff%
84.        /* Add calculated drainage area as attribute of polygon coverage
85.        /* Note for multiple areas, there is the potential that the gridpoly process
86.        /* will result in more polygons than there are zones. To accommodate this
87.        /* possibility, the subareas are added using the grid code rather than the polygon
88.        /* id. Therefore the same area size may appear twice in the PAT.
89.        &sv count = 1
90.   &type Adding watershed area to polygon PAT
91.   &data arc tables
92.   additem %.basn%tmp%.suff%.pat Calc_area(sq.km) 12 12 N 3
93.   select %.basn%tmp%.suff%.pat
94.   calc Calc_area(sq.km) = %.A2%
95.   quit
96.   &end
97.        /* Remove temporary coverages
98.        &if [exists %.basn%d%.suff% -grid] &then kill %.basn%d%.suff%
99.        &popup %.PTH%endw.txt
100.       &messages &on
101. &label jump
102. &end
103. &else &type Please select watershed/subareas since you have multiple pour points.
104. &type Done
105. &return
```

## Menu Files

```
/* Name: askdraw.men
/*---------------------
/* Purpose: Request user to select feature class for display coverage
/* and stores appropriate drawing
/* commands
/*---------------------
/* Calls: None
/*---------------------
/* Called by: basins.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: .type .covt .comm
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 3/01/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
2 /*askdraw.men
/* Draw user- specified coverage
GRID      &sv .type GRID; &sv .covt =; &sv .comm GRIDPAINT; &return
Points    &sv .type COVER; &sv .covt -POINT; &sv .comm POINTS; &return
Lines     &sv .type COVER; &sv .covt -LINE; &sv .comm ARCS; linecolor [response 'Enter a number for the color']; &return
Polygons  &sv .type COVER; &sv .covt -POLY; &sv .comm POLYGONSHADES; ~
      &return
NONE      &sv .type; &return


/* Name: basins.men
/*---------------------
```

```
/* Purpose: This is the main menu for HDDS.
/*---------------------
/* Calls: (On request) infiles.aml preproc.aml idroad.aml idstrm.aml
/* outfall.aml wshed.aml pthleng.aml tofc.aml uslope.aml wshape.aml
/* subshed.aml sclfctr.aml dsgnrain.aml soilgrp.aml rcn.aml shedmask.aml
/* upscale.aml fndquad.aml usgs.aml cleanup.aml setpath.aml
/*---------------------
/* Called by: hdds.aml
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: .home
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 12/01/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 HDDS  /* Pulldown menu
Data
 Existing  &run %.PTH%infiles.aml
 Preprocess  &run %.PTH%preproc.aml
 Workspace  &sv .home [show workspace]; &menu %.pth%wo.men &stripe 'Workspace'
 Set_path  &run %.PTH%stpth.aml
Draw
 Basins  &run %.PTH%chk.aml; GRIDSHADES %.PTH2%%.basn%/%.basn%bas; linecolor 2; arcs %.PTH2%tx/txpoly
 Roads  &run %.PTH%chk.aml; LINECOLOR 1; ARCS %.PTH2%%.basn%/%.basn%rds
 Streams  &run %.PTH%chk.aml; LINECOLOR 15; ARCS %.PTH2%%.basn%/%.basn%sarc
 dlgstrms  &run %.PTH%chk.aml; ARCS %.PTH2%%.basn%/%.basn%sdlg
 Other  &menu %.PTH%askdraw.men &sidebar &stripe 'Feature type'; ~
           &run %.PTH%drawcov.aml
Identify
 Road  &run %.PTH%chk.aml; &TYPE Select road with cursor; &run %.PTH%idroad
 Stream &run %.PTH%chk.aml; &TYPE Select stream with cursor; &run %.PTH%idstrm
 Cell  &run %.PTH%chk.aml; &run %.PTH%outfall.aml
 Line  &run %.PTH%chk.aml; &run %.pth%line.aml
 Movegage  &run %.PTH%chk.aml; &menu %.PTH%gage.men &stripe 'Relocate Gage'
Watershed
 Area &run %.PTH%wshed.aml
 Path_length &run %.PTH%pthleng.aml
 Subareas   &run %.PTH%subshed.aml
 Land_use &run %.PTH%rcn
 Travel_time &run %.PTH%tofc.aml
 Av_Slope   &run %.PTH%uslope.aml
 Shape_fac   &run %.PTH%wshape.aml
 Scale_factor &run %.PTH%sclfctr.aml
Dsgn_rain
 TP40   &run %.PTH%dsgnrain.aml
 ebd    &type Sorry, not active yet!
 Av.Ann  &type Sorry, not active yet!
Soils  &run %.PTH%soilgrp.aml
Mapclip   &run %.PTH%shedmask
UP-scale
 Call_data &run %.PTH%upscale.aml
 Find_quads &run %.PTH%fndquad.aml
THYSYS
 USGS &run %.PTH%usgs.aml
```

```
  SCS  &type Sorry, not active yet!
  Rational &type Sorry, not active yet!
  Gage  &type Sorry, not active yet!
Metadata  &menu %.pth%meta.men &stripe 'Metadata for HDDS'
Cleanup    &run %.PTH%cleanup.aml
Command    &popup %.PTH%tty.txt; &sv .exit = &return; &sv .e = &return; &tty
Clear
Quit


/* Name: cref.men
/*---------------------
/* Purpose: Displays menu for coordinate reference metadata
/*---------------------
/* Calls: None
/*---------------------
/* Called by: meta.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: None
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 /* cref.menu
'Horizontal Coord'   &popup %.pth%%.name%cref1.dat
'Vertical Coord'  &popup %.pth%%.name%cref2.dat
Backup  &return


/* Name: dg.men
/*---------------------
/* Purpose: Displays menu for data quality metadata
/*---------------------
/* Calls: None
/*---------------------
/* Called by: meta.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: None
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 /* dq.menu
'Attribute Accuracy'  &popup %.pth%%.name%dq1.dat
Consistency   &popup %.pth%%.name%dq2.dat
Completeness   &popup %.pth%%.name%dq3.dat
'Positional Accuracy'   &popup %.pth%%.name%dq4.dat
Lineage   &popup %.pth%%.name%dq5.dat
```

'Process Step'  &popup %.pth%%.name%dq6.dat
Backup &return

/* Name: **dist.men**
/*---------------------
/* Purpose: Displays menu of distribution information metadata
/*---------------------
/* Calls: None
/*---------------------
/* Called by: meta.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: None
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 /* dist.menu
Contact   &popup %.pth%%.name%d1.dat
Medium   &popup %.pth%%.name%d2.dat
Liability  &popup %.pth%%.name%d3.dat
Backup  &return

/* Name: **ea.men**
/*---------------------
/* Purpose: Displays menu for entity and attribute metadata
/*---------------------
/* Calls: None
/*---------------------
/* Called by: meta.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: None
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 /* E&A.menu
Overview   &popup %.pth%%.name%ea1.dat
Backup &return

/* Name: **gage.men**
/*---------------------
/* Purpose: Displays menu for streamgage mover
/*---------------------
/* Calls: On requuest - drwgge.aml mvgage.aml ppgge.aml
/*---------------------
/* Called by: basins.men

```
/*----------------------
/* Required variables: .PTH .PTH2
/*----------------------
/* Global variables set: None
/*----------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 3/01/94
/* Last update: 5/8/95
/*----------------------
/* Remarks: Allows user to create grid of relocated streamgage points to ensure coincidence with
/* gridded streams. Streamgage attributes are appended to the grid VAT. The resulting grid of relocated
/* gages can be set as a pourpoint file for subsequent watershed/subarea delineation using PPset.
/*----------------------
1 /* gage.men
Mapextent   mape [getcover * -other]; setwindow [show mape]; &popup %.pth%gwin.txt
Set_window  setwindow * %.PTH2%%.basn%/%.basn%acc
DRAW
  Streams  gridpaint %.pth2%%.basn%/%.basn%strms
  Gages    pointmarkers %.PTH2%tx/txgages 2; points %.PTH2%tx/txgages
  GRDgage  &run %.pth%drwgge.aml
MOVE       &run %.pth%mvgage.aml
LIST       List %.basn%gages%.suff%.vat
PPset      &run %.pth%ppgge.aml
Command    &tty
Clear      Clear
DONE       &return


/* Name: **id.men**
/*----------------------
/* Purpose: Displays menu for identification metadata
/*----------------------
/* Calls: None
/*----------------------
/* Called by: meta.men
/*----------------------
/* Required variables: .PTH .PTH2
/*----------------------
/* Global variables set: None
/*----------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*----------------------
/* Remarks:
/*
/*----------------------
1 /* id.menu
Citation   &popup %.pth%%.name%id1.dat
Description   &popup %.pth%%.name%id2.dat
'Time period'   &popup %.pth%%.name%id3.dat
Status   &popup %.pth%%.name%id4.dat
'Spatial Domain'   &popup %.pth%%.name%id5.dat
Keywords   &popup %.pth%%.name%id6.dat
Access   &popup %.pth%%.name%id7.dat
Use   &popup %.pth%%.name%id8.dat
Backup   &return


/*----------------------
```

```
/* Name: lu.men
/*---------------------
/* Purpose: establishes menu for viewing and  polygon drawing to establish
/*  new land use values and cell velocities  for current watershed.
/*
/*---------------------
/* Calls: On request - lupoly.aml velpoly.aml luadd.aml
/*---------------------
/* Called by: luadj.aml
/*---------------------
/* Required variables: .PTH .PTH2 .basn .suff
/*---------------------
/* Global variables set:
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 01/04/95
/* Last update:
/*---------------------
/* Remarks: The user-defined polygons only modify the land use codes for the working
/* grid of land use, not the permanent vector coverage.
/*
/*---------------------
1 /* pulldown
View
  landuse  gridpaint %.basn%lugrd%.suff% value linear
  Soil gridpaint %.basn%slgrd%.suff%
  Watershed  Linecolor 3; arcs %.basn%tmp%.suff%
  Roads  Linecolor 4; arcs %.pth2%%.basn%/%.basn%rds
  Streams  Linecolor 5; arcs %.pth2%%.basn%/%.basn%sarc
  Cities  points %.pth2%tx/txcty
  County  linecolor 6; arcs %.pth2%tx/txcnty
Check_value
  Landuse  cellvalue %.basn%lugrd%.suff% *
  PCT_soilgrp cellvalue %.basn%slgrd%.suff% *
  Velocity cellvalue %.basn%vel%.suff% *
List_codes
  Landuse list %.pth2%tables/rcns.dat
Setvalue
  Land_use &sv .lucode = [response 'Enter the land use code']
  Velocity &sv .vel = [response 'Enter the velocity (m/s)']
  pct-soilgrp /* &sv .pctsl = [response 'Enter the ??? code']
Draw_polygon
  Land_use &run %.pth%lupoly
  Velocity &run %.pth%velpoly
  PCT_soilgrp &run %.pth%slpoly
Add_lucode &run luadd.aml
Command &popup %.pth%tty.txt; &tty
Clear
Done &return


/* Name: lu_rcn.men
/*---------------------
/* Purpose: Dsiplays menu options for adjusting or appending landuse code/ runoff
/* curve number table (rcns.dat)
/*---------------------
/* Calls: On request - addlu.aml modrcn.aml
/*---------------------
/* Called by: luadd.aml
/*---------------------
```

/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set:
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 3/01/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 /* lu_rcn.men
ADD_LUCODE   &r %.pth%addlu.aml
MODIFY_RCN   &r %.pth%modrcn.aml
COMMAND   &TTY
DONE &return


/* Name: **m.men**
/*---------------------
/* Purpose: Displays menu for metadata reference information
/*---------------------
/* Calls: None
/*---------------------
/* Called by: meta.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set:
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*---------------------
/* Remarks:
/*
/*---------------------
1 /* m.menu
General   &popup %.pth%%.name%m1.dat
Backup  &return


/* Name: **meta.men**
/*---------------------
/* Purpose: Displays main metadata menu
/*---------------------
/* Calls: On request - id.men dg.men org.men cref.men ea.men dist.men m.men
/*---------------------
/* Called by: basins.men
/*---------------------
/* Required variables: .PTH .PTH2
/*---------------------
/* Global variables set: .name
/*---------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 3/01/94
/* Last update: 5/8/95
/*---------------------
/* Remarks: The user must first select the coverage name for which metadata are available using

```
/* the Coverage option. The metadata are provisional and intended to comply with the Federal
/* Content Standards for Digital Geospatial Metadata, June 8, 1994
/*----------------------
1 /* Metadata menu system
Coverage  &sv .q [getchoice Highway Hydrologic_Region ~
-prompt 'Select the coverage for which you want metadata']; ~
&if %.q% = Highway &then &sv .name Hi; ~
&if %.q% = Hydrologic_Region &then &sv .name Hy
Identification        &menu %.pth%id.men &stripe 'Identification Information'
'Data Quality'        &menu %.pth%dg.men &stripe 'Data Quality Information'
Organization          &menu %.pth%org.men &stripe 'Spatial Data Organization'
'Coverage Reference'  &menu %.pth%cref.men &stripe 'Spatial Data Reference'
'Entity & Attribute'  &menu %.pth%ea.men &stripe 'Entity & Atrribute Information'
Distribution          &menu %.pth%dist.men &stripe 'Distribution Information'
'Metadata Reference'  &menu %.pth%m.men &stripe 'Metadata Reference'
Done &return


/* Name: org.men
/*----------------------
/* Purpose: Displays menu for organization information metadata
/*----------------------
/* Calls: None
/*----------------------
/* Called by: meta.men
/*----------------------
/* Required variables: .PTH .PTH2
/*----------------------
/* Global variables set: None
/*----------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 4/21/94
/* Last update: 5/8/95
/*----------------------
/* Remarks:
/*
/*----------------------
1 /* org.menu
'Indirect Spatial Reference'   &popup %.pth%%.name%org1.dat
Backup  &return


/* Name: wo.men
/*----------------------
/* Purpose: Allows user to create and move to workspace
/*----------------------
/* Calls: None
/*----------------------
/* Called by: basins.men
/*----------------------
/* Required variables: .PTH .PTH2 .home .work
/*----------------------
/* Global variables set: .work
/*----------------------
/* Creation Information
/* Author: Peter N. Smith, P.E.
/* Original coding date: 5/8/94
/* Last update: 5/8/95
/*----------------------
/* Remarks:
/*
```

```
/*----------------------
1 /* wo.men
Create &sv .work [response 'Enter the full path and name']; ~
&sys arc createworkspace %.work%; &type Done
'Change to' &wo [getchoice %.work% %.home% -other -prompt ~
'Which workspace?']; &type Done
Cancel &wo %.home%; &return
Done  &return
```

## Message Files

**adjtab.txt**
You are about to make some permanent changes to the
landuse/RCN/velocity table RCNS.dat.

To modify:
Select the record number at the prompt. At the "Edit?:"
prompt,
enter the item and new value.
e.g. hyd-a = 96
If you are finished, hit return until the "Enter Command:"
prompt appears then type QUIT.

To add:
Simply enter the appropriate data at each prompt, hit enter
until the
"Enter Command:" prompt appears then type QUIT.

**clnend.txt**
Finished cleaning up.
You may identify a new outfall or quit.

**clnup.txt**
This process will eliminate the coverages that have just been
created.
If you wish to delete all the files with the active prefix and
suffix
enter "YES" at the command line prompt. (Don't worry no
permanent data
will be lost and it will be easy to regenerate no data!)

**doshed.txt**
It is neccessary to run the watershed option prior to this.
Please idetntify your outfall and run watershed or quit.

**endrcn.txt**
The weighted Runoff Curve number estimation is complete.
Please choose another option.

**endw.txt**
The subareas ahave been delineated and measured.

**endw.txt**
Finished processing - wasn't that fun!
You may now select pathlength, Travel_time, Subareas,
reselect
identify for another location, or quit.

**gpp.txt**

For determination of areas (only) for preset pour points such
as gages
or well points, please now select Watershed / Subareas.
Or if you still wish to calculate a single area, identify the
road/stream
or cell location, then run Watershed / Area. The subarea
option will still
determine areas for the multiple points which you have just
established.

**gwin.txt**
The window area will be set to the map extent unless
you over-ride using the setwindow option.
Processing speed will be minimized by setting the
window area to contain only the desired gages.

**missed.txt**
You missed the feature. Please select identify again.
You may wish to create a closer view using Pan/Zoom,
but you'll have to redraw coverages.

**newdat.txt**
Your new data environment has been established. Now you
may select
Data/Existing and choose your data set. The settings will be
adjusted
accordingly and then you may draw and analyze your data.

**nocode.txt**
You have not yet specified a land use code value.
Please select Set value/ land use and enter a suitable
code before drawing polygons.

**nopth.txt**
path file PTH.txt does not exist.
Please create a one line file file the full path to where
the watershed amls reside e.g. usr2/smith/texas/
Don't forget the trailing "/"

**noscale.txt**
The watershed area must be determined first in order to
establish the
required quadrangles for higher resolution analysis. Please
identify your
outfall and then run Watershed/Area.

**noshed.txt**
No watershed exists for this run.

Please identify an outfall and run watershed
before running subareas.

**nosub.txt**
You selected a subarea break down but
no subareas exist. Please rerun and
select a Watershed break down or run
Watershed/subareas then try a subarea
break down.

**notime.txt**
The time of travel routine has not been run.
Prior to running the subarea routine, the
watershed area and time of travel must have been
determined.

**nov.txt**
You have not yet specified a velocity value.
Please select Set value/ velocity and enter a suitable
value in m/s  before drawing polygons.

**poly.txt**
You may draw as many polygons as you wish. On
completion of each polygon,
hit 9 while in the display window. When you are finsihed
adding polygons
type "y" at the command line prompt.

**ppend.txt**
A grid of pour points has been created.
You may now select Watershed/Area.

**pps.txt**
You many select your outfall cell location(s).
After each point is selected, hit 9.
When you have defined all your outfall points
respond "Y" at the prompt. Otherwise, simply
hit enter at the prompt to continue selecting
cells.

**preproc.txt**
The file of required quadrangles will appear next. If you have
the dems for
these quadrangles, you may select Data/Preprocess to
prepare the data for
use in this system.

**pthend.txt**
The path length and flow path routine is complete.
Please select another option.

**qdfile.txt**
Since you have not selected a record of quad names, you
must specify
the name of a single dem for processing. If you wish to use
multiple
quads, you may either merge theses outside of this system or
create

an ascii file with the names of desired quads. e.g.

Title: DEM names
Tyler
Texarkana
Sherman
end

note that the name is case sensitive.

If you do not enter a name in the following response, you will
return to
the main menu.

**selw.txt**
Select an area to include basin(s) & outfall(s).
The defined box must at least contain the
anticipated drainage area. It's ok if you
overshoot, but the larger the area the
longer the processing time!

**slpend.txt**
Finished processing.
Now you may run THYSYS, clean up, identify another
outfall, or quit.

**strt.txt**
This subsystem determines watersheds and flowpaths and
other hydrologic
parameters using grids of DEM data, flow direction, flow
accumulation, slope,
stream links and highways and arc coverages of streams and
highways.

General information will appear in windows like this one, but
keep an eye on
your command line window from which you invoked
Arc/Info. That is where you
will be prompted and receive status information. To continue,
close this
window by selecting quit in the bottom right corner of this
window. All popup
comment windows must be exited in the same fashion.

**sublimit.txt**
Your hydrologic analysis can be as complex as you desire.
However, you may wish to limit the number of subareas to
be
delineated by specifying an area threshold below which no
subarea will be defined.

**tcend.txt**
The time of concentration routine is complete.
Please select another option.

**tofc.txt**
To minimize processing time, select a box size that just
incorporates

the displayed watershed area.

**tol.txt**
In order to minimize the possibility of selecting the wrong
arc, select two consecutive points on the display to define
the width of the search box. Follow the instructions in the
command
window.

**tty.txt**
This option temporarily passes control to the command line.
After performing desired independent commands, please
type
&return to get back to the main menu.

**upscale.txt**
Now you may perform analyses on the higher resolution
data.
Currently, the attribute data is not sufficient to allow
automatic
locating of the outfall at the higher resolution. Therefore,
please
use "Identify" to reselect the stream. The highway id is still
valid
so you do not need to re-establish that.

## Projection Files

**geoalb.prj**
input
projection geographic
units %.UNITS%
spheroid %.SPH%
datum %.DATUM%
zunits %.UNITS%
parameters
output
projection albers
units meters
spheroid GRS1980
datum NAD83
parameters
29 30 00
45 30 00
-96 0 00
23 0 00
0.0
0.0
end

**utmalb.prj**
input
projection %.proj%
units %.units%
zunits %.ZUNITS%
datum %.DATUM%
spheroid %.SPH%

zone %.ZONE%
parameters
output
projection albers
units meters
spheroid GRS1980
datum NAD83
parameters
29 30 00
45 30 00
-96 0 00
23 0 00
0.0
0.0
end