

Summary of DayCent command lines

The version of DayCent shown here is **DDcent\_vDec2016.exe**. This version requires a PC with the 64-bit version of Microsoft Windows. DayCent is run from the DOS Command Window.

**Definitions of command line arguments:**

<sch\_file> = schedule file name (do not include the .sch extension on the command line)

<binary\_file> = binary file containing all DayCent's monthly output variables (do not include the .bin extension on the command line). Note: This file is not readable, it requires the List100 program **DDcent\_list100\_vDec2016.exe** to extract output.

<extend\_file> = binary file from a previous simulation used to initialize the model for the next simulation (do not include the .bin extension on the command line)

<lis\_file> = ASCII output file containing output extracted from binary file (do not include the .lis extension on the command line)

<txt\_file> = text file that contains a list of variables to extract from the binary file output (for example, outvars.txt)

To run the DayCent model with command line arguments:

**DDcent\_vDec2016.exe -s <sch\_file> -n <bin\_file>**

For instance: run spinup.sch and save to spinup.bin:

DDcent\_vDec2016.exe -s spinup -n spinup

To run the DayCent model extending from a previous simulation:

**DDcent\_vDec2016.exe -s <sch\_file> -n <bin\_file> -e <extend\_file>**

For instance: run example1.sch by extending the simulation from spinup.bin and save to example1.bin

DDcent\_vDec2016.exe -s example1 -n example1 -e spinup

To run the List100 without command line arguments:

**DDcent\_list100\_vDec2016.exe**

To run the List100 program using a list of output variables:

**DDcent\_list100\_vDec2016.exe <bin\_file> <lis\_file> <txt\_file>**

For instance: read binary file example1.bin, save the variables listed in outvars.txt to ASCII file example1.lis

DDcent\_list100\_vDec2016.exe example1 example1 outvars.txt

## Step by Step: A DayCent Tutorial

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### Step 1: Collect your site data.

- a. Create a daily weather data file.
- b. Create soils.in file
- c. Update weather statistics in the <site>.100 file to correspond the weather file.
- d. Update other site-specific parameters in the <site>.100 file

Steps b – d above can be accomplished using the mksitesoil.exe utility. The **mksitesoil.exe** utility will read a file named *site\_soil.txt* and 1) update weather statistics in the <site>.100 file, 2) create a soils.in file, and 3) update several parameters in <site>.100 so they are consistent with soils.in. The *site\_soil.txt* file can be edited using any text editor such as Windows Notepad or Windows WordPad.

The value in site\_soil.txt are:

- First part of the weather and <site>.100 file names
- latitude of site – SITLAT (decimal degrees)
- longitude of site – SITLNG (decimal degrees)
- fraction of sand in the soil – SAND (0.0 – 1.0)
- fraction of silt in the soil – SILT (0.0 – 1.0)
- fraction of clay in the soil – CLAY (0.0 – 1.0)
- bulk density of soil – BULKD (g cm<sup>-3</sup>)
- soil pH
- number of CENTURY (not DayCent) soil layers to simulate – NLAYER (1 – 9)

### Step 2: Create Site Specific Event Options

- a. When creating a new option in a \*.100 file **the first 5 characters** of the abbreviation for the option are used for entering the event into a schedule file. These abbreviations must be unique for each option in the file.
- b. Modify the *outfiles.in* file to indicate the text output files (\*.out \*.csv) you want the model to produce.

### Step 3: Determine the order and types of events that you want to include in the schedule file for your simulation.

Modify example schedule files using a text editor. See *SchedulingEvents.docx* for more information.

Step 4: Run your simulation

a. The command line for running the **DDcent\_vDec2016.exe** model is:

```
DDcent_vDec2016.exe -s <sch_file> -n <bin_file>
```

- where *sch\_file* is the name of your schedule file without the .sch extension
- *bin\_file* is the name of the binary file of monthly output that will be created without the .bin extension.

For organizational sake it is easier to keep track of which schedule file and binary file go together if the same or similar file name is used for both files. For example, to run the example.sch file to produce a binary output file named example.bin use the command line:

```
DDcent_vDec2016.exe -s example -n example
```

b. **DDcent\_vDec2016.exe** can also be run using information from the end of a previous simulation as a starting point for a new simulation. This option is used when the model has been run to simulate a site up to a specific time period and you wish to run the model forward in time using different options to examine how different management practices will affect the model output. For example, traditional cropping until 2005 and then 4 simulations from 2006 to 2100 one with no-till, one with a reduced amount of fertilizer applied, one using a different crop rotation, and one where the site is allowed to go back to native conditions.

To run the DDcent\_vDec2016.exe model extending from a previous simulation use the command line:

```
DDcent_vDec2016.exe -s <sch_file> -n <bin_file> -e <extend_file>
```

- where *sch\_file* is the name of your schedule file without the .sch extension,
- *bin\_file* is the name of the binary file of monthly output that will be created without the .bin extension, and
- *extend\_file* is the name of the binary file that will be read as a starting point without the .bin extension.

Using the example above and extending from a file named historic.bin the command line is as follows:

```
DDcent_vDec2016.exe -s example -n example -e historic
```

Step 5. Examine the model output

a. It is important to check the net primary productivity (NPP) that the model is predicting for your site. If the NPP for your site is not correct then none of the other model output can be expected to be representative of the conditions at your site.

b. If desired, use the **DDcent\_list100\_vDec2016.exe** utility to extract output variables from the \*.bin file into an \*.lis file in ASCII format. To run **DDcent\_list100\_vDec2016.exe** use the command line:

```
DDcent_list100_vDec2016.exe
```

and follow the on-screen prompts. The **DDcent\_list100\_vDec2016.exe** utility can also be run using an input file containing a list of output variables that you wish to extract from the file. This option can be useful when running the model using a batch file or script.

```
DDcent_list100_vDec2016.exe <bin_file> <lis_file> <txt_file>
```

- where *bin\_file* is the \*.bin file from which you wish to extract data without the .bin extension,
- *lis\_file* is the output file that will be created by the **DDcent\_list100\_vDec2016.exe** utility without the .lis extension, and
- *txt\_file* is a text file with a list of output variables one per line.

For example, to extract information from the example.bin file to create an example.lis file with the output variables in the outvars.txt file use the command line:

DDcent\_list100\_vDec2016.exe example example outvars.txt

c. For binary output file variable definitions (extracted into a .lis file with **DDcent\_list100\_vDec2016.exe**) see the following documentation:

*Appendix\_2.Model\_Output\_Variables.pdf*

d. The \*.out and \*.csv output files are text files. For descriptions of the output contained in these files see the following documentation:

*Appendix\_2.Model\_Output\_Variables.pdf*

# Day-of-Year Table for Non-Leap Years

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1	32	60	91	121	152	182	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245	275	306	336
3	3	34	62	93	123	154	184	215	246	276	307	337
4	4	35	63	94	124	155	185	216	247	277	308	338
5	5	36	64	95	125	156	186	217	248	278	309	339
6	6	37	65	96	126	157	187	218	249	279	310	340
7	7	38	66	97	127	158	188	219	250	280	311	341
8	8	39	67	98	128	159	189	220	251	281	312	342
9	9	40	68	99	129	160	190	221	252	282	313	343
10	10	41	69	100	130	161	191	222	253	283	314	344
11	11	42	70	101	131	162	192	223	254	284	315	345
12	12	43	71	102	132	163	193	224	255	285	316	346
13	13	44	72	103	133	164	194	225	256	286	317	347
14	14	45	73	104	134	165	195	226	257	287	318	348
15	15	46	74	105	135	166	196	227	258	288	319	349
16	16	47	75	106	136	167	197	228	259	289	320	350
17	17	48	76	107	137	168	198	229	260	290	321	351
18	18	49	77	108	138	169	199	230	261	291	322	352
19	19	50	78	109	139	170	200	231	262	292	323	353
20	20	51	79	110	140	171	201	232	263	293	324	354
21	21	52	80	111	141	172	202	233	264	294	325	355
22	22	53	81	112	142	173	203	234	265	295	326	356
23	23	54	82	113	143	174	204	235	266	296	327	357
24	24	55	83	114	144	175	205	236	267	297	328	358
25	25	56	84	115	145	176	206	237	268	298	329	359
26	26	57	85	116	146	177	207	238	269	299	330	360
27	27	58	86	117	147	178	208	239	270	300	331	361
28	28	59	87	118	148	179	209	240	271	301	332	362
29	29		88	119	149	180	210	241	272	302	333	363
30	30		89	120	150	181	211	242	273	303	334	364
31	31		90		151		212	243		304		365