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MEMORANDUM

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SUBJECT: Updated Irrigation Demands for SFWMM2000-Seminole Tribe, Big Cypress
Reservation

This memo presents details of the process performed to update the Irrigation Demands of the Seminole Tribe, Big Cypress Reservation for use in the SFWMM2000. It included extending the period of record for demands from 1996-2000 and correcting mistakes found in demands for the 1965-1995 period.

Procedure:

- 1) The programs previously used by Jeff Giddings and Ken Tarboton to estimate the 1965-1995 irrigation demands (see memo from Ken Tarboton to Luis Cadavid, November 26, 1996) for the Tribe were located and rerun.

Program 1:

/net/buzzard/usr/users/ET/et_2/Bc_2/bc-input31.f

Input: devil6595.dat
data
Output: input

This program reformats the weather data and fills in the missing daily values with the long-term daily value for the month (i.e. fills the missing daily value with one of 12 possible daily values, one for each month). It needs to be run once for each crop type with the input file "data" and the output file "input" changing according to the crop type.

Program 2:

/net/buzzard/usr/users/ET/et_2/Bc_2/bc.f

Input: input
Output: output

This program is based on the Blaney-Criddle (B-C) method for calculating irrigation demands and uses weather data from the Devils Garden station (NOAA COOP weather

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station). Similar to Program 1, Program 2 also needs to be run once for each crop type. After this program is run for each crop, the monthly demands for the period of record, produced by this program, are listed next to their respective year and month in the file 6595demand.monthly.

Program 3:

/net/buzzard/usr/users/ET/et_2/Bc_2/mon2day.f

Input: 6595demand.monthly

Output: 6595demand.daily

This program disaggregates the total monthly irrigation demands into daily values by dividing the monthly demand by the number of days in the month and allocating that demand to each day in that month. It also converts the demand from MGM to ac-ft/day. Program 3 also has to be run once for each crop type.

After Program 3 is run for each crop type, the daily irrigation demands for all crops are added and put into file 6595demand.daily.all. This file is eventually put into DSS format.

Note: While rerunning these programs for the period 1965-1995, an error was found in the way the missing precipitation values were handled by Program 1. Originally, the file devil6595.dat used -99999 to identify missing values. When the program encountered missing values (-99999) for Tmax or Tmin, these were substituted by the long-term daily value for the month. However, when the program encountered missing precipitation values (-99999), these were substituted incorrectly by 0. As a consequence, the monthly precipitation was being slightly underestimated resulting in a slight overestimation of the irrigation demands. This was corrected by modifying devil6595.dat so that missing values for all 3 variables were denoted as 99999. See Table 1 below.

Crop Type	Acreage	Maximum Monthly (MGM) 1965-1995 ^a	Maximum Monthly (MGM) 1965-1995 ^b	Average Annual (MGY) 1965-1995 ^a	Average Annual (MGY) 1965-1995 ^b
Pasture	11,389	3,018	3,018	12,505	12,269
Sm. Veg	2,898	844	844	3,554	3,489
Citrus (85%)	575	84	84	447	438
Citrus(50%)	1,730	432	432	2,285	2,242
Total	16,592	4,378	4,378	18,791	18,438

^aMissing values identified as -99999 in devil6595.dat

^bMissing values identified as 99999 in devil6595.dat

Table 1. Comparison of 1965-1995 irrigation demands using -99999 or 99999 to denote missing values.

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- 2) Daily precipitation and temperature (Tmax, Tmin) data for the Devils Garden station for the period 1996-2000 was obtained from the NOAA COOP weather station CD-ROM. Data for the months shown in Table 2 were not found on the CD-ROM, the printed climatological data (NOAA-NCDC, 2000) or the NOAA website (<http://www.ncdc.noaa.gov/>). Several additional single days (not listed in Table 2) were also missing.

Precip	08/1999, 12/2000
Tmax	08/1999, 12/2000
Tmin	07/1996, 08/1999, 12/2000

Table 2. Whole months with missing data for 1996-2000.

- 3) The updated land use for 2000 for the Big Cypress Reservation was provided by Craig Tepper, an Engineer for the Seminole Tribe (personal communication between Craig Tepper and Ken Konyha, October 5, 2001). Only the acreages for Citrus 85% and Pasture have changed. See comparison of 1995 and 2000 acreages in Table 3 below.

	1995 Acreage	2000 Acreage
Pasture	11,389	10,176
Small veg.	2,898	2,898
Citrus 85%	575	494.5
Citrus 50%	1,730	1,730
Total	16,592	15,298.5

Table 3. 1995 and 2000 acreages for the different crops.

- 4) The following program was used to convert the 1996-2000 climate data from NOAA into the same format of devil6595.dat so that both files can be concatenated into the single file devil6500.dat

Program 4:

`/net/oyster/nb1/SFWMM2000/BCR_Demands/final/ok_miss_val/65-00/convert.f`

Input: devil9600.dat

Output: devil9600.conv (same format as devil6595.dat)

Then: `cat devil6595.dat devil9600.conv > devil6500.dat`

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- 5) A modified version of Program 1 was created to take into account 36 years of data instead of 31 as in Program 1.

Program 5:

/net/oyster/nb1/SFWMM2000/BCR_Demands/final/ok_miss_val/65-00/bc-input36.f

Input: devil6500.dat
 data
Output: input

Again, this program needs to be run one time for each crop type with the input file “data” and the output file “input” changing according to the crop type.

- 6) Programs 2 and 3 were rerun for 1965-2000. After Program 3 was rerun for each crop type, the daily irrigation demands for all crops were added and put into file 6500demand.daily.all.
- 7) The total daily irrigation demands in file 6500demand.daily.all (in ac-ft/day) were put into DSS file /vol/hsm2/data/sfwmm/SFWMM_2000/Demands/dmdro2x2.dss with pathname /SFWMM/IR_DMD/DEMAND/01JAN1965/1DAY/FUT_REV/

Results:

- 1) The irrigation demands for 1965-2000 (new calculations) were compared with the values previously computed for 1965-1995 (old calculations). See Table 4 and Figures 1-2.

Comparison of the irrigation demands for old and new calculations, show:

- A decrease in the maximum monthly irrigation demands (MGM) for Pasture and Citrus 85% for the period 1965-2000 (Table 4) as compared to the 1965-1995 period based on old calculations. This is due to a reduction in acreages for these two crops in 2000 as compared to 1995.
- A decrease in the average annual irrigation demands (MGY) for all crops in 1965-2000 (Table 4) as compared to the 1965-1995 period based on old calculations. This is due to the combined effects of a reduction in acreages for Pasture and Citrus 85% in 2000, and the correction made to the way in which missing precipitation values are designated.
- The total (sum of demands for all crops) daily irrigation demands in the period 1965-1995 based on old calculations (6595demand.daily.all) are about 9% smaller than those for the new calculations (portion of 6500demand.daily.all) as drawn from the regression shown in Figure 1. This is due to the combined effects of a reduction in acreages for

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Pasture and Citrus 85% in 2000, and the correction made to the way in which missing precipitation values are designated.

- The long-term total (sum of demands for all crops) daily irrigation demands in the period 1996-2000 are in general (for 8/12 months) larger than those for 1965-1995 based on new calculations (portions of 6500demand.daily.all) (Figure 2). This reflects the drier conditions observed in the region of South Florida during the 1996-2000 period.

Crop Type	1995 Acreages	Maximum Monthly (MGM) 1965-1995	Average Annual (MGY) 1965-1995
Pasture	11,389	3,018	12,505
Sm. Veg	2,898	844	3,554
Citrus (85%)	575	84	447
Citrus(50%)	1,730	432	2,285
Total	16,592	4,378	18,791

Crop Type	2000 Acreages	Maximum Monthly (MGM) 1965-2000	Average Annual (MGY) 1965-2000
Pasture	10,176	2,696	11,026
Sm. Veg	2,898	844	3,511
Citrus (85%)	494.5	73	379
Citrus(50%)	1,730	432	2,256
Total	15,298.5	4,045	17,172

Table 4. Comparison of irrigation demands for 1965-1995 and 1965-2000 based on old and new calculations.

Figure 1. Comparison of the total daily irrigation demands for the period 1965-1995 based on old and new calculations.

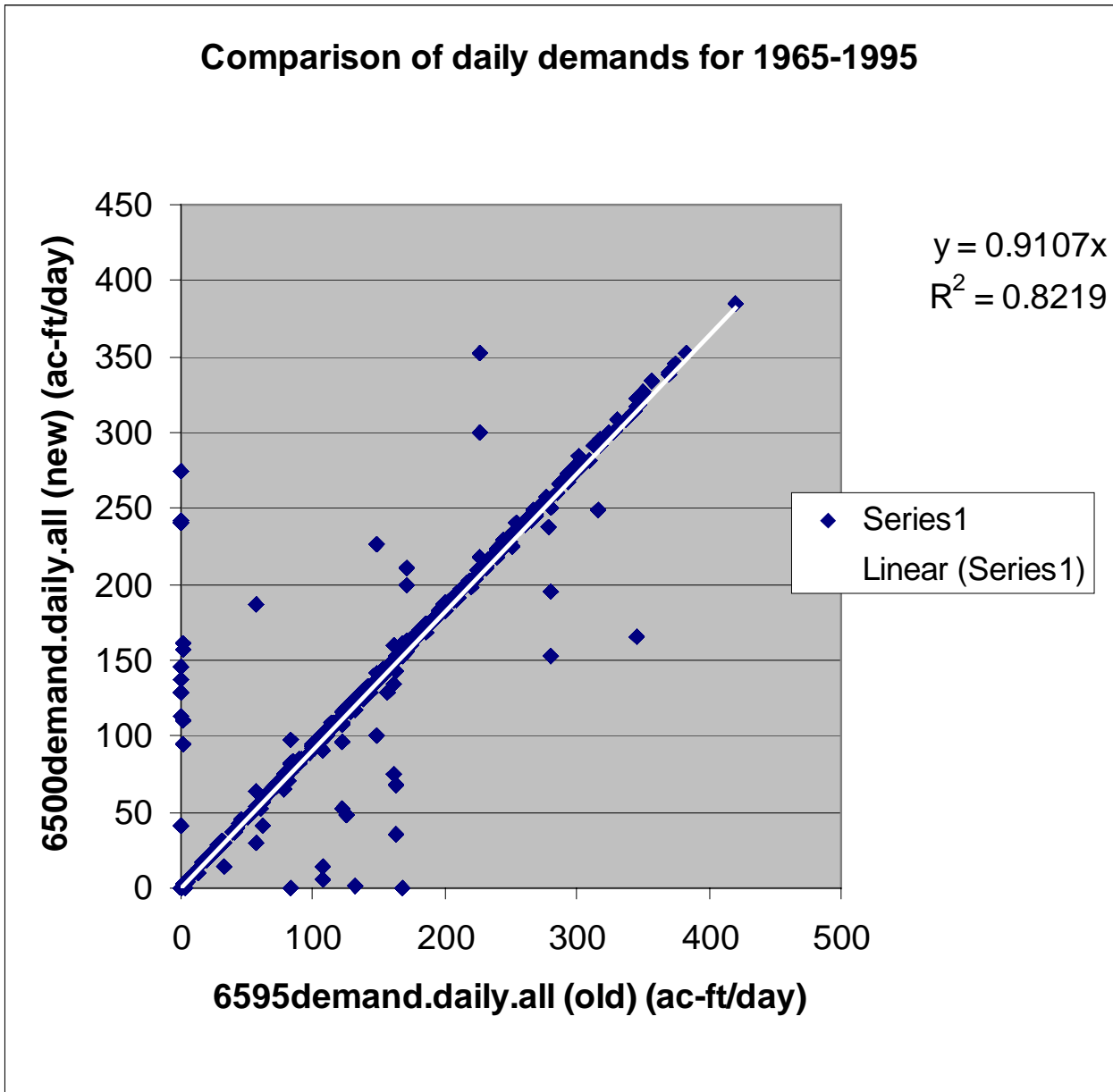
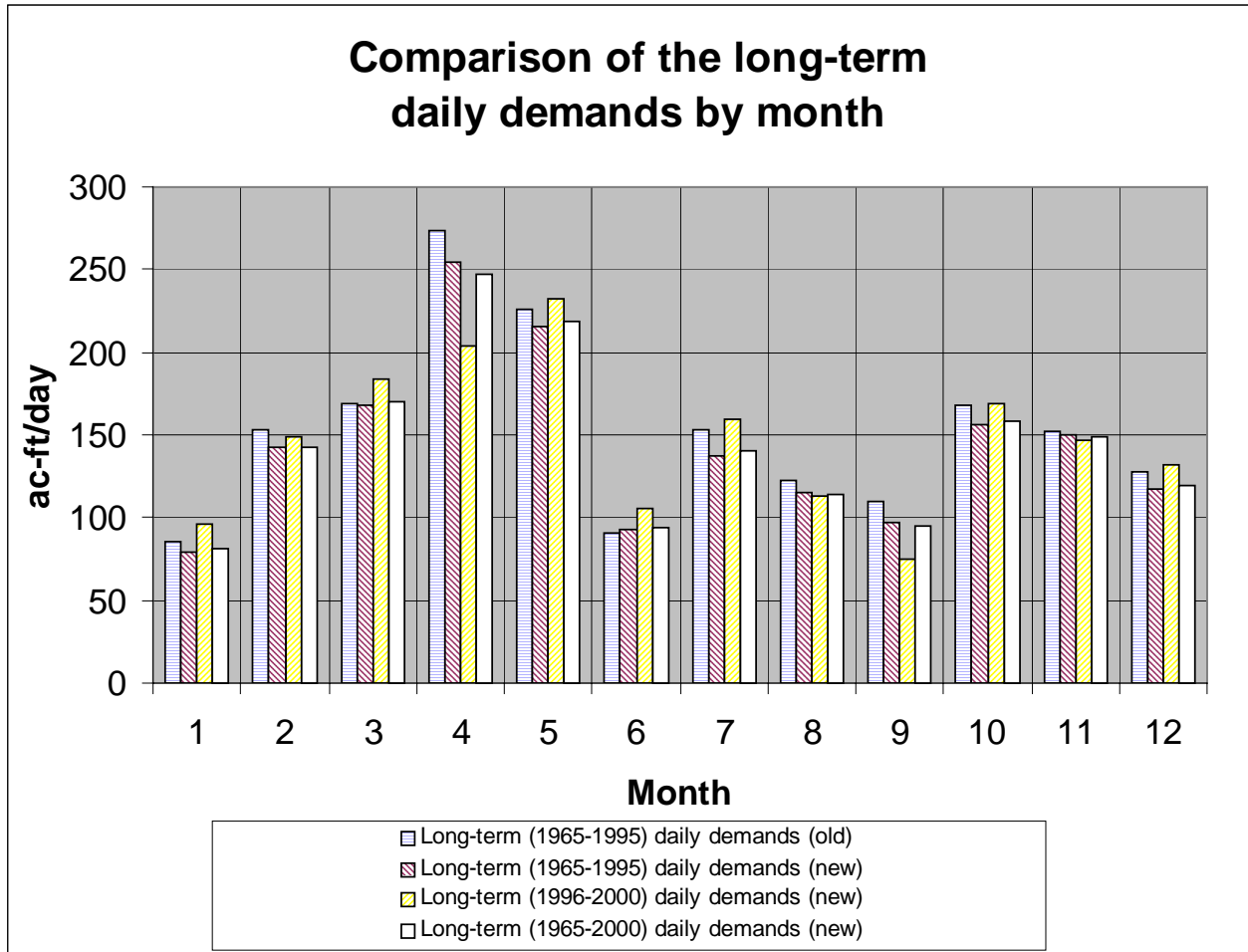


Figure 2. Comparison of the long-term total daily irrigation demands by month based on old and new calculations.



Reference:

National Oceanic and Atmospheric Administration – National Climatic Data Center. Climatological Data for Florida, November, 2000. Vol. 104, Number 11. p. 8-9, 14-15.

MI/mi

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