

USERS' GUIDE TO SUSTAIN1
A FISCAL PLANNING MODEL FOR ALASKA

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The ISER Sustainable Spending Worksheet

I. Introduction

The ISER Sustainable Spending Worksheet (SUSTAIN1) is a simplified representation of the State of Alaska's General Fund appropriations, saving and dissaving activity, and General and Permanent Fund balances. It is designed to explore the effects of various Permanent Fund policies and revenue assumptions on the life of the Permanent Fund and the State's ability to fund various future appropriation levels.¹ For a user-supplied level of future appropriations, expected future revenues, and policy choices regarding Permanent Fund dividends and personal income taxes, SUSTAIN1 answers the following questions:

- o What is the annual pattern of saving and spending over the next 50 years?
- o When do savings out of revenues stop and withdrawals from funds begin?
- o When does Permanent Fund principal begin to be drawn upon to sustain future appropriation levels?
- o When are the General and Permanent Funds exhausted?

SUSTAIN1 starts with a set of assumptions about state revenues:

- o Current financial assets (General and Permanent Fund balances)
- o Recurring revenues (corporate taxes, sales tax, etc.)

¹An analysis of current potential expenditure policies using SUSTAIN1 can be found in "A Spending Strategy for Fiscal Stability: Resetting the Spending Limit and Planning the Use of the Permanent Fund," ISER Working Paper 85.4 by Scott Goldsmith and Steve Colt, June 1985.

- o Petroleum revenues
- o Petroleum revenue contributions to the Permanent Fund
- o New revenue sources (mineral development, TAPS tariff settlement, etc.)
- o Return on state financial assets

Coupled with these exogenous revenue variables are a set of annually specified fiscal policy choices:

- o Are dividends paid out of the Permanent Fund?
- o Is a state personal income tax levied?
- o Do General Fund accruals stay in the General Fund or are they transferred to the Permanent Fund?

Finally, the user sets a target (desired) level of state appropriations in real (1984) dollars--either constant at some level or varying from year to year.

With this information, the model computes for each year from 1985 to 2035 (in either nominal or real dollars):

- o Total state revenues
- o Realized General Fund appropriations (which may be less than desired appropriations)
- o General Fund earnings and balance
- o Permanent Fund earnings and balance
- o Permanent Fund dividends paid
- o Total state saving or dissaving
- o Fund which is the source of dissaving

The model runs as a Lotus 1-2-3 electronic worksheet (requiring 256K), but it is not necessary to know 1-2-3 in order to use it productively. A simple example is presented in section II, followed by a more detailed description of the worksheet in section III. Procedures for updating the model are described in the final section.

II. Using the Model: An Example

The best way to understand SUSTAIN1 is to use it. This section will completely describe a sample session with the model. We will investigate the implications of setting the spending limit at \$2 billion (1984\$) and then look at the effect of eliminating dividends in 1990. You are encouraged to follow along by executing the underlined commands that follow. Whatever happens, do not be afraid to strike keys. There are backup copies of the model on your disk should you change the working version more than you intend to.

LOAD MODEL

To begin, you must have 1-2-3 software loaded into your machine and actually be in 1-2-3 with a spreadsheet showing on your screen. The details involved in this step vary somewhat, depending on what type of computer you are using. Have someone familiar with 1-2-3 load it and show you how. Next, insert the SUSTAIN1 disk in the unused disk drive. Now type:

/fr

1-2-3 will display a menu of files to retrieve. (The pointer should be highlighting 'SUSTAIN1.' If not, use the right arrow key to highlight 'SUSTAIN1.')

Hit the enter or 'return' key

It takes about 30 seconds for SUSTAIN1 to load. When the model loads successfully, you will see a welcome message on the screen.

HOW TO ESCAPE

Look at the upper right of the screen for a READY sign. This highlighted "mode indicator" tells where 1-2-3 is "at." Most of the time, 1-2-3 is READY for your next command. If the mode is flashing WAIT, then you must wait a few more seconds; for recalculation and file retrieval, up to 30 seconds. The [ESC] or escape key is very useful for getting back to READY mode. You may find yourself caught in MENU or CMD MENU mode; to get out, press [ESC] one or more times. Sometimes it shows ERROR. You can usually get from ERROR back to READY by pressing [ESC] or [RETURN]. Sometimes there seems to be no way to get back to READY and you must use the "panic button": hold down [CTRL] and press [SCROLL LOCK] at the same time. (This procedure works for IBM and Compaq machines only.) This works even if WAIT is flashing, but using it could mean losing a printout or calculation.

THE SUSTAIN1 MENU OF ACTIVITIES

All 1-2-3 worksheets are controlled with a series of commands selected from menus offered at the top of the screen. In addition, the SUSTAIN1 model has a special set of "customized" menu choices.

Enter the SUSTAIN1 main menu by holding down [ALT] and typing the letter z.

You may hear a buzzer, which is completely normal. 1-2-3 shows CMD MENU as the mode; you are in the special menu. The control panel at the top of the screen shows these command choices:

VIEW PRINT CHANGE RECALC SAVE QUIT HELP
View selected parts of the worksheet

CMD MENU

Use the left arrow and right arrow keys on the numeric keypad to highlight a choice with the pointer. As you highlight different choices, a description of each choice appears on the next line down. To actually execute a highlighted choice, hit [RETURN]. As a shortcut, you may choose and execute a menu task simply by pressing the first letter of that choice.

Choose VIEW by highlighting it and then pressing [RETURN] or simply pressing v.

A new menu appears, offering a choice of what table of information about the current model run to view:

CASE EXOG FISCAL SUMMARY GEN PERM QUIT
Summary of assumptions

Move the pointer back and forth to check out the descriptions of your options. QUIT will take you back one step to the main menu. Another important way to back up is to hit [ESC] once. Each time you press it, you will back up one step: 1st to the main menu, then out of the menu, and back to READY mode.

Type c to choose CASE.

You should now be looking at the following screen which summarizes important parameters and policies used in the current run:

= SUSTAIN1 ===== ISER ==== 08-Aug-85 =====
 ----CASE SUMMARY-----

SPENDING LIMIT====> 1800

POLICY SWITCHES (1=YES,0=NO):	INITIAL VALUE	SWITCH DATE	
PAY DIVIDENDS ? (DIVPOL)	1	1990	<=====
INCOME TAX ? (TAXPOL)	0	9999	<=====
GEN. FUND SAVINGS STAY IN GF ?	1	*****	

PARAMETER	EXPLANATION	VALUE
ROR.RL	REAL RATE OF RETURN	0.030
GR.IPD	GENERAL INFLATION RATE	0.050
MULT	INCOME TAX INCOME AS FRACTION OF OTHER RECURRING (RSGE.REC)	1.00
NOMSWITCH	CALCULATE IN NOMINAL \$ IF NOMSWITCH SET TO 1	0

The cell pointer should be over the current spending limit figure. Let's try setting a spending limit of \$2000 (1984 millions of \$). With the pointer still over the old limit,

Type in 2000 [RETURN]

Re-Enter main menu by pressing [ALT] z

Now calculate the new results with this change:

Choose RECALC with pointer and [RETURN] or type r

It is critical to recalculate whenever the CALC sign is on at the bottom of the screen, otherwise results may be erroneous. It takes about 12 seconds. (1-2-3 Users: use this menu procedure and not the F9 key because the RECALC macro makes changes to the column headings

to show real versus nominal dollars.) When the CMD MENU shows again, the screen displays the top of the summary table. At the lower right, we see that with a spending limit of 2000 (=\$2 billion), the Permanent Fund is exhausted in the year 2006 if it is used to sustain this level of appropriation..

Type q to return to READY mode

You should now be in READY mode. You can now view yearly results that are 'off-screen' by using the down arrow key to move the pointer down to the years in question. Similarly, you can bring new columns on screen by "scrolling over" using the left and right arrow keys. The [Pg Up] and [Pg Dn] keys are handy for jumping down 20 rows at a time. Of course, to view results of unknown location, you should use the VIEW choice in the main menu. If you now want to see results for the Permanent Fund:

Enter main menu with [ALT] z

Choose VIEW then PERM by typing vp

To complete this example, we will implement a policy change that will extend the life of the Permanent Fund: the elimination of dividends beginning in 1990.

Enter main menu with [ALT] z

Choose VIEW then CASE (as before)

Use arrow keys to move pointer down 4 rows and

2 columns right.

The pointer should be under SWITCH DATE on the Pay Dividends ? line.

Type in 1990 [RETURN].

This sets the date when the dividend policy will change from yes (=1) to no (=0).

Enter main menu with [ALT] z; then choose RECALC.

After waiting 12 seconds you see the new results: the Permanent Fund is exhausted 4 years later as a result of the policy change.

The basic procedure for using the model should now be clear: type over one or more assumptions, then recalculate and look at the results. When using the model, keep these points in mind:

1. Enter the main menu with [ALT] 'z' whenever 1-2-3 shows READY.
2. Make menu choices whenever CMD MENU shows, or 'back up' with [ESC].
3. The PRINT choice allows a number of tables to be printed.
4. The SAVE choice stores the current version of the worksheet on disk under the name SUSTAIN1.
5. Those cells that contain information which should not be altered are "write protected" to avoid accidental alteration.

III. Model Structure and Details

This section lists all the available parameter, variable, and menu choices. Figure 1 shows an overall schematic diagram of the worksheet for reference.

FIGURE 1

SUSTAINI: SCHEMATIC

row	column									
	A	B	C	G	J	Q	AB	AE	AM	AQ
1	Help			MACROS			CASE			Instructions on changing variables
20	Instructions on changing parameters			MACROS			Case Assumptions Summary			Instructions on changing variables
40										
44	HEADINGS					HEADINGS				
54	EXOG	FISCAL	SUMM	GENEUND	PERFUND					
58	Y	Exogenous	Fiscal	Summary	Permanent					
62	E	Variables	Policy	of	Fund					
66	A	Switches	Results	Activity	Activity					
70	R	1								
74	S									
78										
82										
86										
90										
94										
98										
102										
104										

←----- Computations
 take
 ←----- place
 in the
 double-lined
 rectangle

MODEL PARAMETERS

Table 1 shows the parameters which can be found on the case summary screen using the VIEW CASE menu combination.

TABLE 1. PARAMETERS ON THE CASE SCREEN

Policy Switches

Policy switches must take the value 1 (=yes) or 0 (=no).

Cell Location	Name	Explanation
AE8	DIVSTRT	Enter a 1 if Permanent Fund dividends are to be paid beginning in 1987; 0 if not.
AE9	TAXSTRT	Enter a 1 if the personal income tax is levied beginning in 1987; 0 if not.
AE10	GFSWCH	Enter a 1 if General Fund savings and earnings are to stay in the General Fund; 0 if they are to be transferred to the Permanent Fund. Transferring General Fund dollars to the Permanent Fund increases the level of dividends paid out and reduces the level of sustainable spending.

Table 1 (continued)

Policy Switch Dates

A switch date must be a year greater than 1987 and indicate when a once-and-for-all change should be made to the policy (subsequent to the initial value). The value "9999" is used to indicate no change through the analysis period.

Cell Location	Name	Explanation
AF8	DIVSWCH	Enter the year to switch dividend policy from payment to nonpayment or vice versa.
AF9	TAXSWCH	Enter the year to repeal (or adopt) the personal income tax.

Other Parameters

AF14	ROR.RL	Enter the real rate of return on state financial assets as a decimal (.03 represents 3 percent).
AF15	GR.IPD	Enter the general rate of inflation as a decimal.
AF16	MULT	Enter the ratio of future annual personal income tax revenue to future annual other recurring revenues.
AF18	NOMSWCH	Enter a 1 to express the results in nominal dollars without adjustment for inflation. A value of zero specifies results in constant 1984 dollars.
AD4	SPENDLIM	This parameter sets a constant real spending limit for the fiscal years 1987 through 2035.

A higher general inflation rate (GR.IPD) reduces the sustainable spending level by increasing the amount of dividends (expressed in real \$) which are paid out. Changing NOMSWCH from 0 to 1 does not change the maximum sustainable spending level (or year of fund exhaustion). Expressing results in nominal dollars does delay the reported year when Permanent Fund "principal" is first drawn upon. This phenomenon occurs because the nominal value of the principal may be increasing while the real value has begun to decline.

Table 2 lists parameters which are one screen to the right of the case screen. They may be viewed using the 1-2-3 tab key or by using the right arrow key. There should be no need to change these parameters in the normal course of running the model.

TABLE 2. ADDITIONAL CASE PARAMETERS

Cell Location	Name	Explanation
AK13	GFSTART	General Fund balance at the end of 1984.
AK14	PFSTART	Permanent Fund balance at the end of 1984.
AK16	PFEQSTART	Permanent Fund contributed equity at the end of 1984.
AK18	GR.REC	Growth rate of recurring revenue after 2010.

GR.REC has been set, based on the average rate of growth of projected revenues for the period 2006 to 2010, the last five years for which MAP model projections are available. This rate is computed in cell AH21, allowing cell AK18 to be changed by direct input of a new growth rate. To restore the formula, retype "+AH21" in cell AK18.

EXOGENOUS VARIABLES

SUSTAIN1 requires four vectors of exogenous variables, contained in columns C through F, beginning on line 54, as listed in Table 3. For each variable, yearly values must be present for the years from 1984 until 2035 (or the desired end of the planning horizon, if shorter). All revenue numbers must be entered in 1984 dollars, whether or not you plan to compute results in nominal dollars.

TABLE 3. EXOGENOUS VARIABLES

Column	Name	Description	Default Source
C	RSGF.REC	Exogenous Recurring Revenues (nonpetroleum General Fund revenues net of General Fund earnings)	MAP Model Simulation DSET A5.11
D	RSGF.PET	General Fund Petroleum Revenues	ADOR March '85 50% case, as reflected in MAP model DSET A5.11
E	RSGF.MISC	General Fund Miscellaneous Revenues Not Currently Collected	Supplied by user, to include proposed mineral or other development projects
F	RSPF.PET	Petroleum Revenue Contributions to Permanent Fund	MAP Model Simulation DSET A5.11

FISCAL POLICY VARIABLES

Fiscal variables are summarized in Table 4.

The three vectors specifying fiscal policy are normally determined by parameters from the CASE SUMMARY screen and hence do not need to be input directly. The vector of annual spending limits is installed as a constant amount determined by the SPENDLIM parameter in cell AD4. Similarly, the DIVPOL and TAXPOL vectors of zeros and ones are each determined by a starting value and switch date (e.g. DIVSTRT, DIVSWCH).

TABLE 4. FISCAL POLICY VARIABLES

Column	Name	Description	Default Source
G	SPENDLIM	Spending Limit (1984 \$)	Set as a parameter in cell AD4, on CASE SUMMARY screen
H	DIVPOL	Vector of ones and zeros determining if dividends are paid	Controlled by parameters DIVSTRT, DIVSWCH
I	TAXPOL	Vector of ones and zeros determining if income taxes are levied	Controlled by parameters TAXSTRT, TAXSWCH

It is possible, however, to directly enter these vectors to produce any desired annual pattern of spending limits or fiscal policy changes. To enter your own vectors, simply type the desired numbers directly into the appropriate cells in columns G, H, or I. Any values you do not type over will still be determined by their respective controlling parameters. A special macro has been

provided to restore the original dependence of these three vectors on the parameters. Simply use the CHANGE DEFAULT menu sequence. Separate macros can restore the formulas for individual vectors while leaving others in their altered states. Press [ALT] and either G, H, or I simultaneously to restore individual columns G, H, or I, respectively.

Example: You want to investigate the effects of a spending limit that declines gradually until the year 2000, then remains constant at 1200 (millions of 1984 \$). Use the VIEW FISCAL menu sequence and then type over Column H cells through the year 2000. To set the value of 1200 for the remaining years, choose VIEW CASE and type 1200 in the SPENDING LIMIT cell (AD4). After recalculating, you decide to restore the constant spending limit. The CHANGE DEFAULT menu sequence accomplishes this.

SUSTAIN1 MENU CHOICES

Table 5 lists all available choices on the SUSTAIN1 menu. The SUSTAIN1 main menu is called with [ALT] z. The VIEW, PRINT, and CHANGE choices are also titles of their respective sub-menus. Both the RECALC and SAVE menu choices on the main menu are quite similar, but not equivalent, to commonly used 1-2-3 commands. Please note the differences:

(1) RECALC does more than invoke the F9/CALC key. It also checks to see if nominal or real dollars have been selected and retypes column headings accordingly. Hence, it is critical to use RECALC when switching from nominal to real dollars.

(2) SAVE is equivalent to issuing:
/FILE SAVE SUSTAIN1 [RETURN] REPLACE

from 1-2-3 READY mode. Any pre-existing worksheets named SUSTAIN1 on the current data disk will be overwritten.

TABLE 5. SUSTAIN1 MENU STRUCTURE

Main Menu Choices	Sub-Menu Choices	Description
VIEW		Calls the VIEW sub-menu to look at different parts of worksheet
	CASE	Summary of assumptions
	EXOG	Exogenous variables
	FISCAL	Fiscal policy variables
	SUMMARY	Summary of results
	GENERAL	General Fund activity
	PERM	Permanent Fund activity
	QUIT	Return to SUSTAIN1 main menu
	HELP	Abbreviated help screen
PRINT		Calls the PRINT sub-menu to print tables
	CASE	Summary of assumptions
	EXOG	Exogenous and fiscal variables
	SUMMARY	Summary of results
	GENERAL	General Fund activity
	PERM	Permanent Fund activity
	ALL	All 5 tables in sequence
	QUIT	Return to SUSTAIN1 main menu
CHANGE		Calls the CHANGE sub-menu to change assumptions
	PARAMS	Receive instructions on changing parameters
	VARIABLES	Receive instructions on changing variables
	DEFAULT	Restore the original formulas for spending limit, dividend, and tax policy vectors
	QUIT	Return to SUSTAIN1 main menu
RECALC	NA	Recomputes the worksheet
SAVE	NA	Saves the current version of the worksheet on disk under the name SUSTAIN1
QUIT	NA	Returns user to 1-2-3 READY mode

MODEL EQUATIONS

The basic model equations are listed in Figure 2 exactly as they are entered in the worksheet. Many of the expressions use the 1-2-3 IF-THEN-ELSE statement which is of the form:

@IF (Expression, THEN result, ELSE result)

This means that if the "expression" is true (or nonzero), then the result of the statement is "THEN result." If the "expression" is false (or equal to zero), then the result of the statement is "ELSE result." Leading dollar signs on range names may be ignored; they have no mathematical significance.

FIGURE 2

SUSTAIN1 Equation Reference

B59: (F0) 1990
 C59: U 213.178
 D59: U 1720.23
 E59: U 195
 F59: U 236.275
 G59: U +\$SPENDLIM
 H59: U @IF(B59<\$DIVSWCH,\$DIVSTRT,1-\$DIVSTRT)
 I59: U @IF(B59<\$TAXSWCH,\$TAXSTRT,1-\$TAXSTRT)
 J59: +V59
 K59: +U59
 L59: (,0) +AA59
 M59: +Y59
 N59: '| EXHAUSTED:
 P59: '|
 Q59: @IF(\$NOMSWCH,C59*AU59,C59)+Z59*(@IF(\$NOMSWCH,(1+\$ROR.RL)*(1+\$GR.IPD)-1,\$ROR.RL))
 R59: @IF(\$NOMSWCH,D59*AU59,D59)
 S59: +L59*\$MULT*(@IF(\$NOMSWCH,C59*AU59,C59))
 T59: @IF(\$NOMSWCH,+E59*AU59,E59)
 U59: @SUM(Q59..T59)
 V59: (,0) @IF(\$NOMSWCH,G59*AU59,G59)
 W59: (,0) 0.05*(+K59+S59+T59+@IF(\$NOMSWCH,C59*AU59,C59))
 X59: (,0) +V59+W59
 Y59: (,0) +U59-AA59
 Z59: (,0) +AD58
 AA59: (,0) @IF(U59>=X59,U59-X59,@IF(X59-U59<=(AJ59+AD58),U59-X59,-(AD58+AJ59)))
 AB59: (,0) @IF(U59-X59>0,(U59-X59)*\$GFSWCH,@IF(X59-U59<=Z59,U59-X59,-Z59))
 AC59: (,0) +AA59-AB59
 AD59: (,0) @IF(AE59,@IF(\$NOMSWCH,AE59*AU59,AE59),Z59+AB59)
 AE59: (,0) +AL58
 AG59: (,0) @IF(\$NOMSWCH,F59*AU59,F59)
 AH59: (,0) +AF59*@IF(\$NOMSWCH,(1+\$ROR.RL)*(1+\$GR.IPD)-1,\$ROR.RL)
 AI59: (,0) +H59*@IF(AW59/2<=AF59+AH59,AW59/2,(AE59+AH59))
 AJ59: (,0) +AF59+AG59+AH59-AI59
 AK59: (,0) +AC59
 AL59: (,0) @IF(AP59,@IF(\$NOMSWCH,AP59*AU59,AP59),AJ59+AK59)
 AM59: (,0) +AM58+AG59
 AN59: (,0) +AL59-AM59
 AO59: (,0) @IF(AN59>=0,AM59,AL59)
 AP59: @IF(AA59>=0,1,0)
 AR59: @IF(AL59>0,1,0)
 AS59: @IF((AN59<0+AND\$AK59<0)+OR\$AL59<=0,0,1)
 AU59: (F4) +AU58*(1+\$GR.IPD)
 AV59: (AE59*@IF(\$NOMSWCH,1,AU58))*((1+\$ROR.RL)*(1+\$GR.IPD)-1)
 AW59: @AVG(AV54..AV58)/@IF(\$NOMSWCH,1,AU59)

IV. Updating the Model

SUSTAIN1 should be updated whenever information on any assumptions changes, primarily when revenue projections are updated or fund balance figures are revised.

REVENUE PROJECTIONS

Revenues are categorized as Recurring (RSGF.REC, Column C), Petroleum (RSGF.PET, Column D), and Miscellaneous (RSGF.MISC, Column E). All exogenous revenue projections must be in millions of 1984 \$. General Fund earnings are computed by the model based on the user-specified real rate of return, ROR.RL. To maintain consistency, when General Fund petroleum revenue assumptions are changed, Permanent Fund petroleum revenue assumptions (RSPF.PET, Column F) must also be revised.

FUND BALANCES

Actual balances are reported at the close of each fiscal year. When these figures become available, they should be converted to 1984 \$ and typed into the worksheet columns AE and AP, thus updating the General and Permanent Fund year-end balances, respectively.