The Effect of the Various 8.5 SMA Plans on Flow into Florida Bay

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The question of which 8.5 SMA plan provides the optimum freshwater inflows into Florida Bay was raised at the 1 May 2000 SFWMD governing board meeting. In order to answer this question, the model results were analyzed in two parts. The first part concerns the ground water and overland flow; the second concerns the flow through the S-18c and S-197 structures. For this exercise both a dry (1989) and wet (1995) year were analyzed. The wet year also had an additional 1-in-10 year storm event superimposed. The goal is to determine which plan provides more water to Florida Bay. Using an inland transect and structures should minimize the boundary effects near the shore of Florida Bay.

The plan (plan 5) labeled as "buyout" includes the C-111 project in place and all the 8.5 SMA land bought out. No other canals, levees or structures exist to mitigate any effects of the higher water levels for D13R within the model domain.

Figure 1 shows a transect through which MODBRANCH model flows (overland and sub-surface) rates were calculated and summed for monthly and yearly totals. Figure 2 shows bar graphs for each month of 1989 (dry year) and1995 (wet year + 10 year rainfall event). Figure 3 shows a bar graph of total yearly volume of flow towards Florida Bay as a percentage of the "Buyout" volume. The alternative with the largest volume of water passing southward through this transect is 6C, followed, in order, by 2B, 6B, 6D, 8A, Buyout, 1, and 3.

From the modeler's point of view, there is **no significant difference** between any of these options. The various plans relative to the "buyout" option indicate that the percentage of difference between total yearly volumes range from 98.9 – 104.7% of "buyout" for 1995 and from 96.9 – 100.5% of "buyout" for 1989.

The total volume of water into Florida Bay, as a performance measure, was never mentioned by the ENP until May 1, 2000**. If this is a critical performance measure,** then alternatives, in order of highest to lowest Florida Bay flows, are shown below.

Aquifer & Overland Flow to Florida Bay	1989	1995	Average
Highest	2B	6C	6C
.	1	2B	2B
.	6C	6B	6B
.	8A	6D	6D
.	**Buyout**	8A	8A
.	6D	**Buyout**	**Buyout**
.	6B	3	1
.	3	1	3
Lowest			

The difference in the volume of water that passes through S-18c but not S-197 is an indication of additional flow to Florida Bay. It is actually a measure of the volume of water passing through S-18c that leaves the canal through either leakage or overbank flow. Flow through S-197 is into Barnes Sound and generally does not contribute to Florida Bay. Figures 4 and 5 show the total monthly volumes through S-18c and S-197, respectively, for both 1989 and 1995. Figure 6 shows the average annual flow as a percentage of "buyout" for both S-18c and S-197 (top) and the differences in average annual flow between S-18c and S-197. Generally, the plan that has the largest value of Q(S-18c) – Q(S-197), will provide more freshwater flow to Florida Bay. The table below lists the various plans in order of highest to lowest difference. Based on this, the four "best" plans, in order, are 6C, 2B, 6B, and 6D.

Difference between S-18c and S-197	Average
Highest	6C
.	2B
.	6B
.	6D
.	**Buyout**
.	8A
.	3
.	1
.	

Note that the actual operating conditions and configuration of the C-111 project (S-332A, S-332B, S-332C, and S-332D) may change these values. However, in this analysis, each of these structures was operated in exactly the same manner. If the future C-111 project has a more pronounced effect than that modeled here, it will no doubt be a much larger influence than the 8.5 SMA plans.

An additional point is that the 8.5 SMA is within the NE Shark River Slough watershed, which drains to the west (Whitewater Bay, etc.). The flow into Florida Bay is via Taylor's Slough, a different watershed altogether.

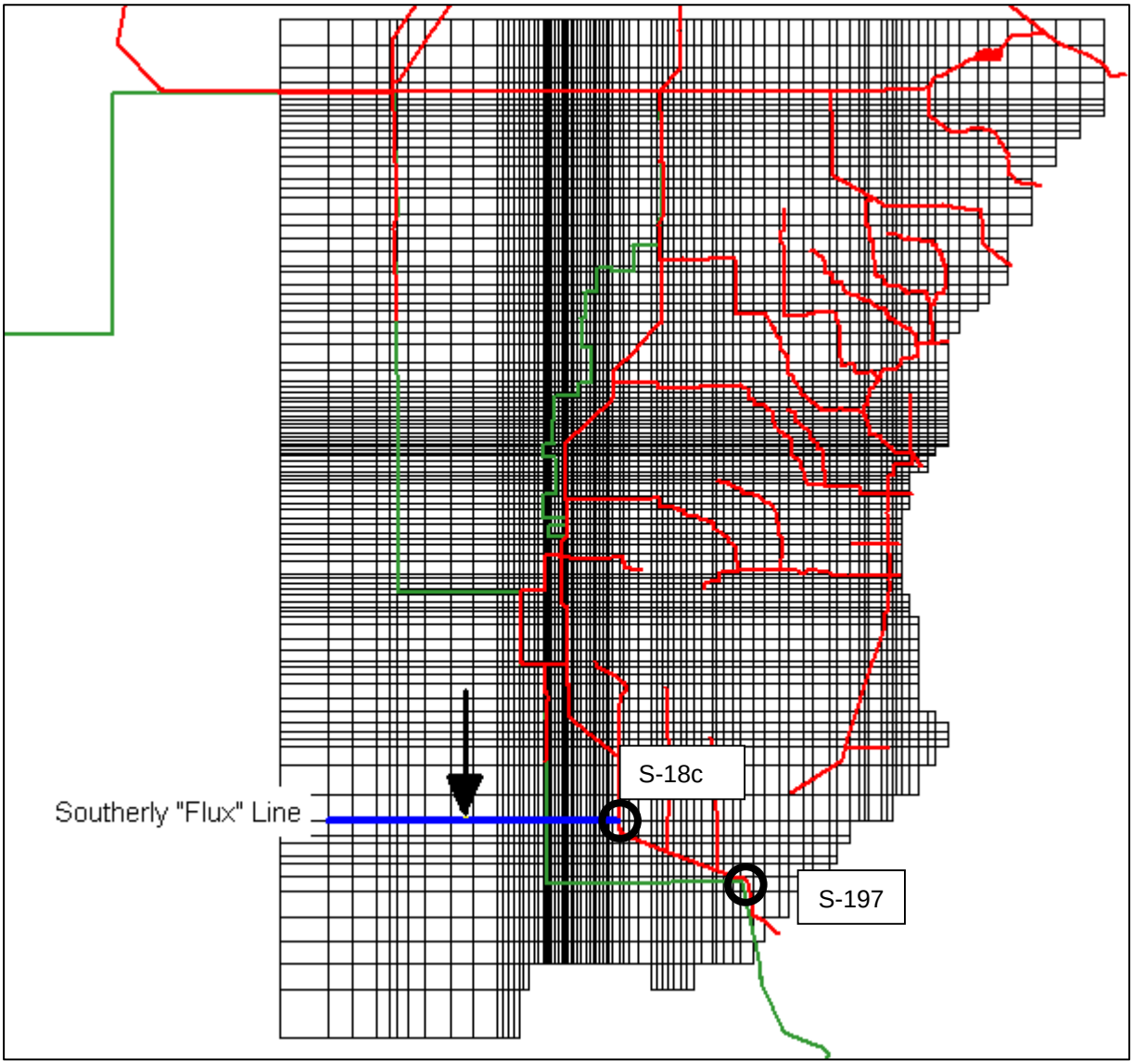
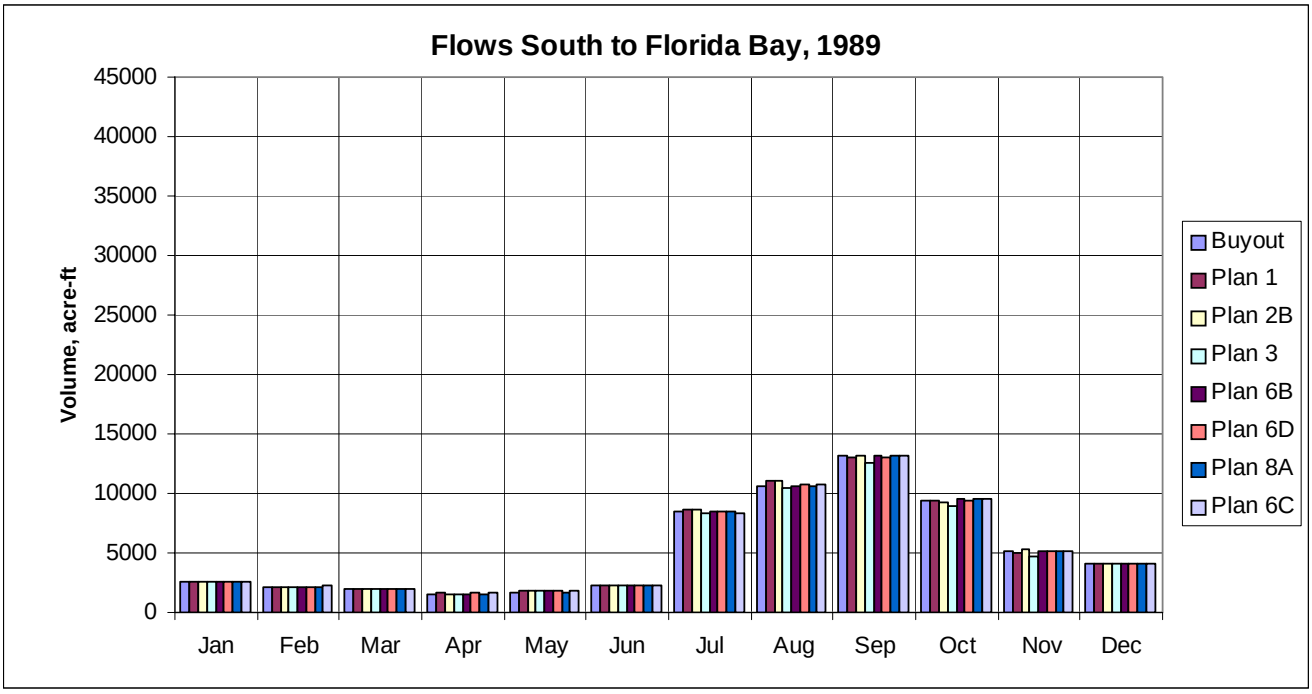


Figure 1. Location of transect and structures S-18c and S-197 where volumes are computed.



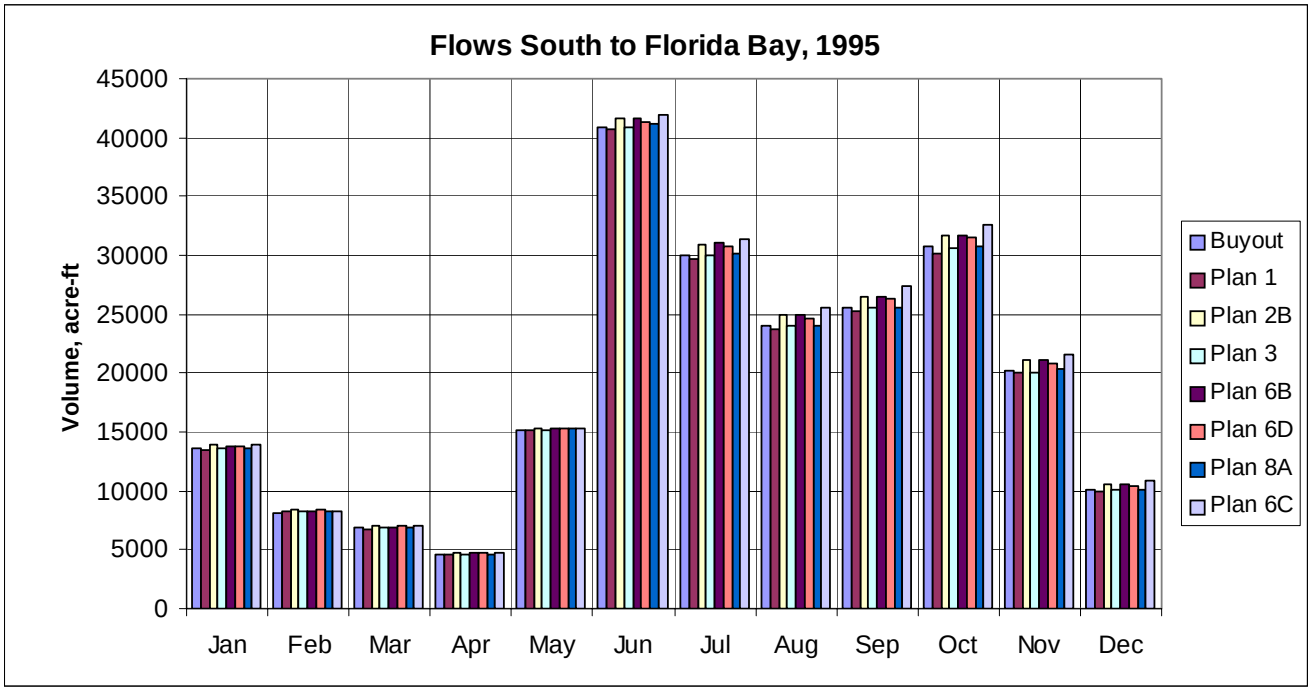


Figure 2. Monthly volumes for 8.5 SMA Plans.

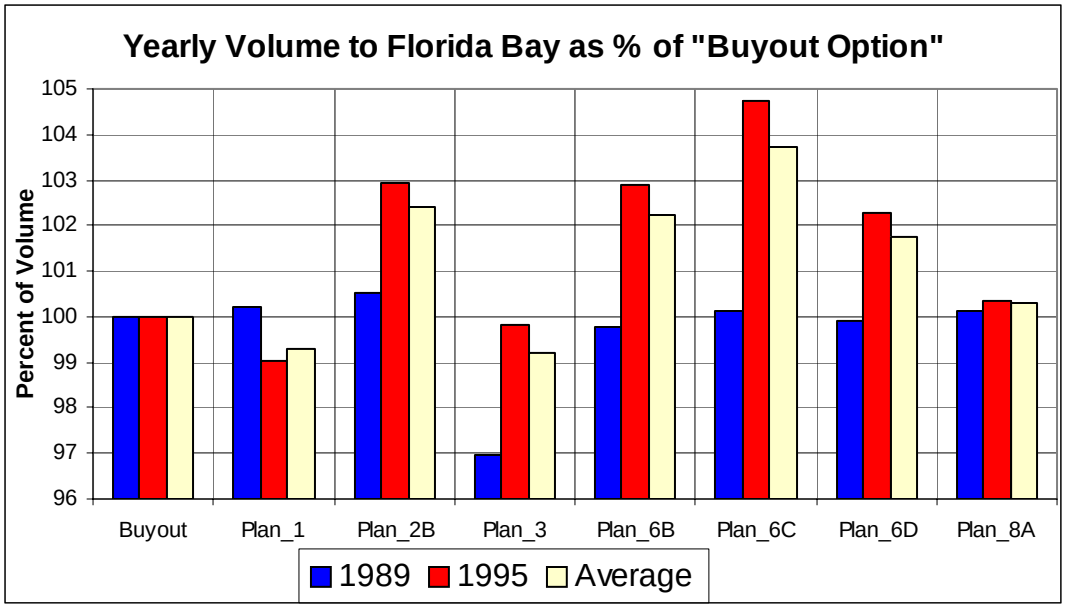
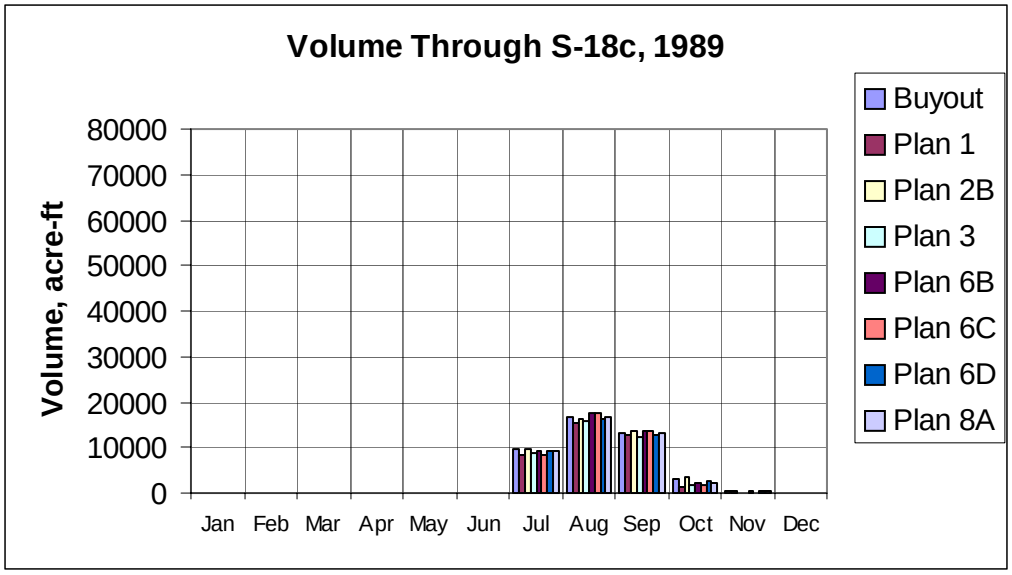


Figure 3. Total Yearly Volume as a Percent of "Buyout" Plan.



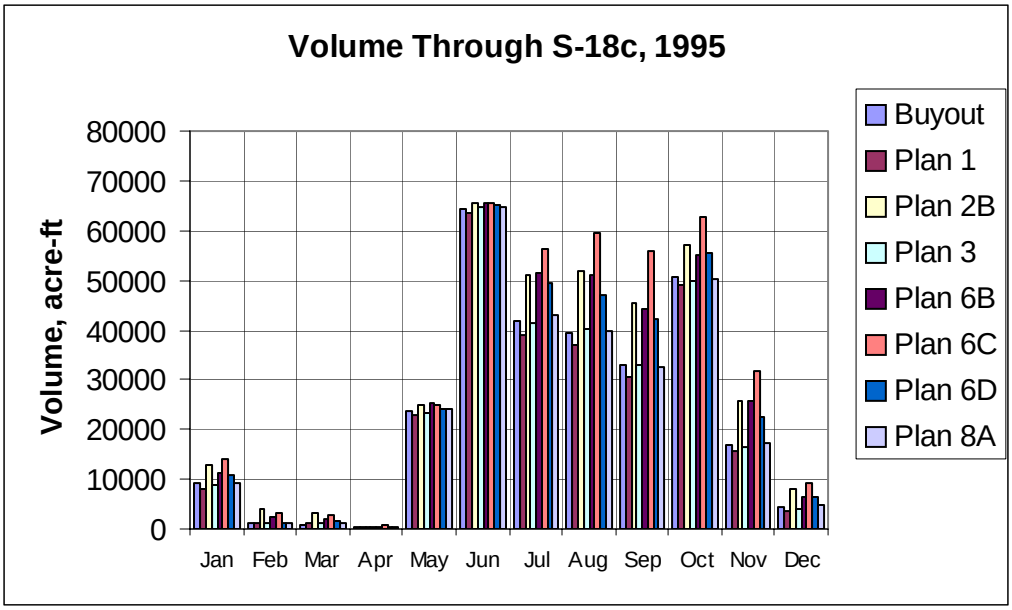
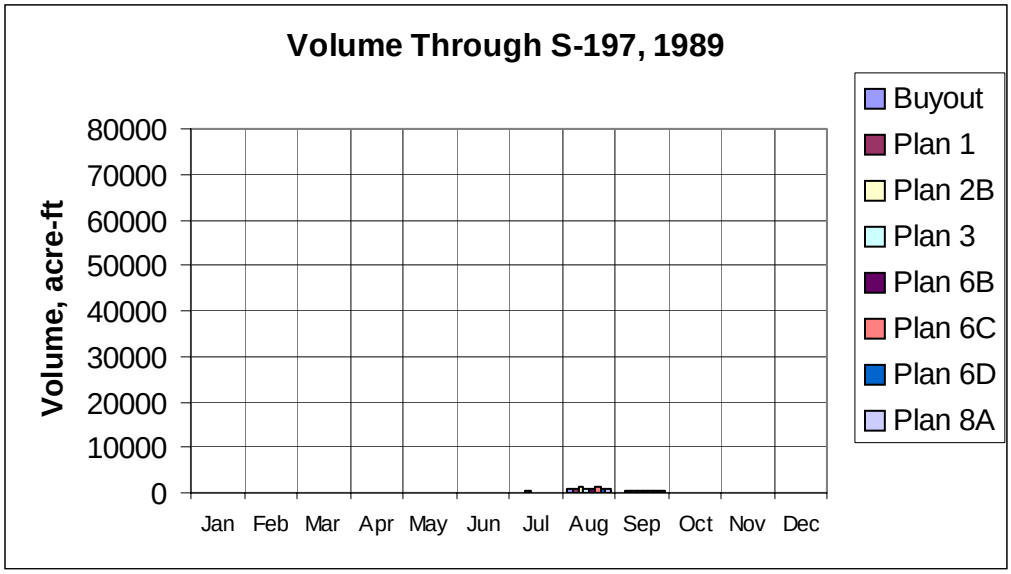


Figure 4. Total Volume through S-18c, 1989 and 1995.



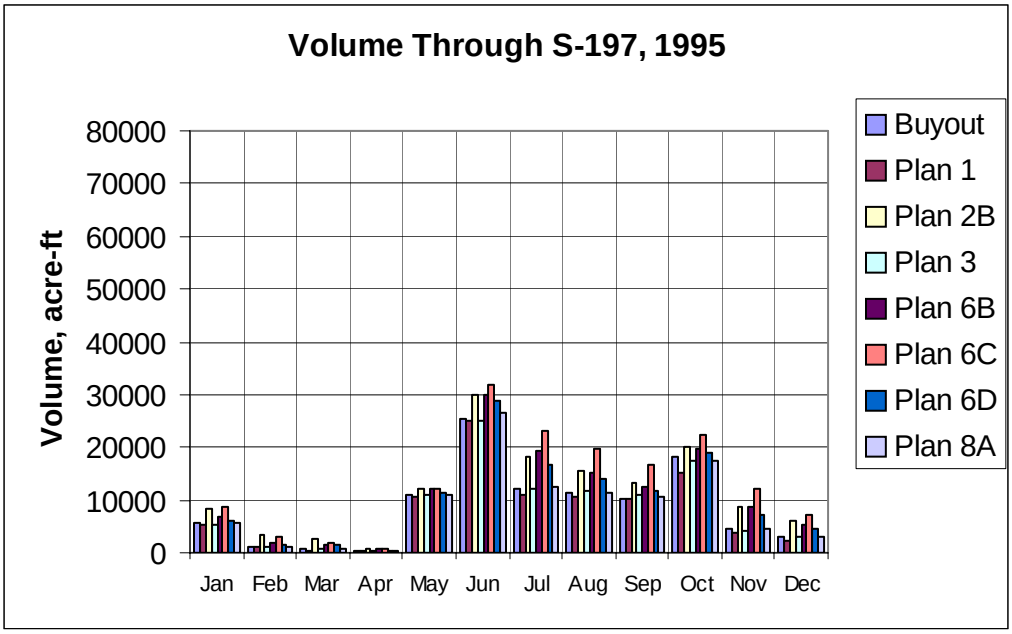
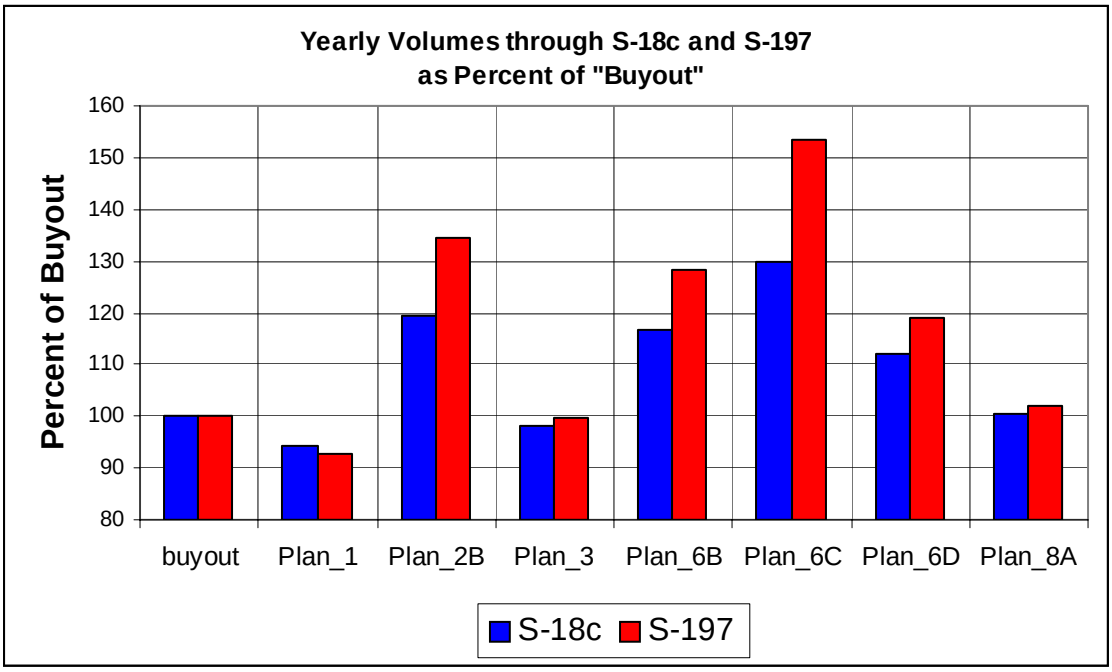


Figure 5. Total Volume through S-197, 1989 and 1995.



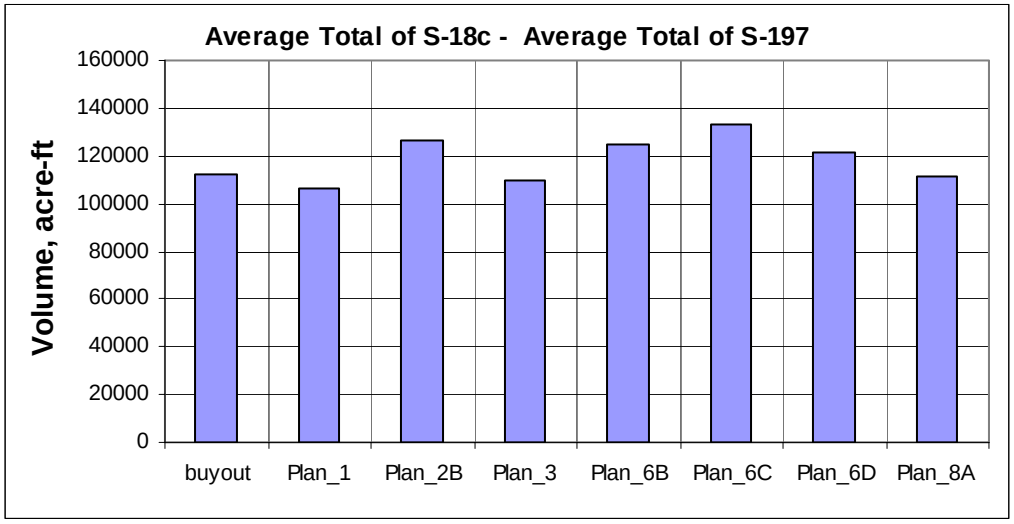


Figure 6. Percent of Total Volume through S-18c & S-197 relative to "Buyout" (top).
Difference in Average Yearly Totals (S-18c – S-197) (bottom).