

Treatment of 3300 a.f. @ \$166/a.f. =	548,000
Power & chemical costs 3300 a.f. @ \$150/a.f. =	495,000
Dam maintenance =	<u>15,000</u>

Total Estimated Annual Cost \$2,272,100

Additional water yield from the new Dry Gulch Reservoir 3,300 a.f./yr. Dry year water costs would be:

$$\text{Water Cost} = \frac{\$2,272,100 / \text{yr.} \times 1,000 \text{ gals.}}{3300 \text{ a.f./yr.} \times 325,851 \text{ gals./a.f.}} = \$2.11 \text{ per 1,000 gals.}$$

## 6. EVALUATION OF ALTERNATIVES AND SELECTED PLAN

Table 6-1 contains a summary list of the alternates evaluated to provide additional water supply sources and their respective dry year estimated water yield, construction cost and annual cost per 1,000 gallons of water produced. The cost estimates are preliminary, meaning that alternatives within 10% to 15% are essentially the same cost.

Table 6-1  
Comparison of Cost For Additional Alternate Water Supply Sources

	Alternate Water Supply Source	Estimated Dry-Year Yield (a.f./yr.)	Construction Cost	Annual \$ per 1000 gals.
1	Increase Supply and Capacity of Snowball Water Treatment Plant	1,904	\$6,868,530	\$2.05
2	Improve Dutton Ditch and Stevens WTP to 1 m.g.d. With Existing Reservoirs	717	\$3,946,740	\$2.55
3	Improve Dutton Ditch With Enlarged Stevens Reservoir and WTP to 2 m.g.d.	1172	\$6,608,938	\$2.50
4	Construct Martinez Dam Without Improved Dutton Ditch	325	\$3,353,018	\$3.39
5	Construct Martinez Dam and Enlarge Hatcher Water Treatment Plant With Improved Dutton Ditch	730	\$7,243,758	\$3.73
6	Enlarge Stevens Reservoir and WTP to 2 m.g.d. Without Improved Dutton Ditch	682	\$3,264,198	\$2.27
7	Construct Dry Gulch Reservoir and New Snowball WTP	3,300	\$12,925,700	\$2.11

The alternatives to provide additional water supplies to PAWSD are separated into two cost categories. Alternatives 1, 2, 3, 6 and 7 have nearly the same annual cost per 1,000

gallons and are in the lowest cost group. Alternatives 4 and 5 are in the high cost group, about 50% greater than the low cost group.

Alternatives 4 and 5 are not recommended for consideration because of the significantly higher group cost than alternatives 1, 2, 3, 6 and 7.

Alternatives 1 and 7 are not recommended because their yield is more than double the amount needed in 2025. In the case of alternative 7, the existing rate payers are not able to finance the debt service to construct this large project and the existing water distribution system has insufficient capacity to utilize the large yield.

Alternatives 2 and 6 provide 717 and 682 acre-feet per year respectively. Individually these yields are not quite adequate for the 2025 demand of 782 acre-feet per year.

Alternative 3 provides 1,172 acre-feet per year which is enough water to serve 2025 projected population with some buffer to offset possible inaccurate estimates. The conveyance capacity of the existing Dutton Ditch has declined in the last 15 years. It is a critical supply to the water treatment plants at Hatcher and Stevens Reservoirs. Alternative 3 can provide the added benefit of improving the delivery system to both the Hatcher and Stevens WTPs.

These alternate water supply sources included in Alternative 3 have the ability to provide an emergency water supply to the town portion of the system if the Jackson Mountain soil slide disables the transmission pipeline that supplies the Snowball WTP or contamination of the river should occur. In addition, these sources will provide gravity flow of an additional water supply to the town portion of the distribution system. As these alternatives would divert during largely none irrigation season periods, reduction in river flow to critical levels would be less likely compared to direct river diversions.

Alternative 3, Improve Dutton Ditch, Stevens Reservoir and its WTP to 2 m.g.d., is the alternative that provides water at the lowest unit cost and meets the 2025 water demand. Table 6-2 provides a summary of alternative evaluations.

Table 6-2  
Summary of Alternative Evaluations

	Alternate Water Supply Source	Summary of Evaluation
1	Increase Supply and Capacity of Snowball Water Treatment Plant	Provides more water than is needed
2	Improve Dutton Ditch and Stevens WTP to 1 m.g.d. With Existing Reservoirs	Does not provide an adequate amount of water to meet 2025 demand

3	Improve Dutton Ditch With Enlarged Stevens Reservoir and 2 m.g.d. WTP	Recommended Plan – Lowest unit water cost that adequately matches 2025 demand
4	Construct Martinez Dam Without Improved Dutton Ditch	Highest unit water cost and does not supply sufficient water to meet 2025 demand
5	Construct Martinez Dam and Enlarge Hatcher Water Treatment Plant With Improved Dutton Ditch	The unit water cost is nearly the highest and does not supply sufficient water to meet 2025 demand
6	Enlarge Stevens Reservoir and WTP to 2 m.g.d. Without Improved Dutton Ditch	Higher unit water cost than selected plan and does not supply sufficient water to meet 2025 demand
7	Construct Dry Gulch Reservoir and New Snowball WTP	Provides far more water than is needed and is beyond PAWSD ability to finance

## 7. SELECTED PLAN

### 7.1. Description of the Selected Plan

The selected plan is the improvement of the existing Dutton Ditch, enlargement of Stevens Reservoir and the associated water treatment plant to 2 m.g.d. capacity.

#### Dutton Ditch

The Dutton Ditch derives its water supply from Fourmile Creek at a diversion approximately nine miles northerly of the Town of Pagosa Springs. The ditch then conveys water into the Dutton Creek drainage that is tributary to Stevens Reservoir. A pipeline is available to carry a portion of the Dutton Creek flow to Hatcher Reservoir. The capacity of the open ditch has declined from  $\pm 12$  c.f.s. to  $\pm 4$  c.f.s. within the last 15 years due to accumulation of sediment and difficulty in stabilizing the ditch at two locations where it crosses unstable hillsides. This portion of the selected plan would involve construction of a pipeline largely along Forest Service access roads to a connection with the existing pipeline extension delivering water to Hatcher Reservoir. The pipeline would carry at least PAWSD's water rights in the ditch. The pipeline would be  $\pm 28,500$  feet long and would be designed to carry  $\pm 12$  c.f.s.

The pipeline returns the ability to divert water during the winter and increases the capacity of the system so PAWSD's water right can be carried regardless of other priorities in the ditch.