



## UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street

San Francisco, CA 94105-3901

359

JUN 10 1994

George Barnes  
Calif. Dept. of Water Resources  
1416 Ninth St.  
Sacramento, CA 95814

Dear Mr. Barnes:

EPA would appreciate DWR's help in estimating the water supply impacts of several possible formulations of standards to protect estuarine habitat and salmon smolt migration through the delta.

We have attempted to minimize the number of runs required to evaluate the impacts of several alternatives described in comments to us on our draft standards. We anticipate that the results of these runs will help in developing an effective and efficient standard but none of these formulations should be construed as our 'preferred alternative.'

We have not included any modeling conditions that relate to the style of standard setting described by yourself at the Bay/Delta Modeling Forum workshop on sliding scales. If you can get the data needed to perform a comparable DWRSIM run, we would be very interested in the results.

It appears that the use of 'Year' as a variable in the regression equation as developed in comments by CUWA and WRMI addresses the same problem addressed in the DWR comments on the need to account for level of development. The regression equation is a simpler approach so we are using it as a surrogate for all of the efforts to quantify the impacts of LOD. If you believe that the DWR approach is not adequately encompassed by this approach we would be very interested in a DWRSIM run that compares the two at the same target level of development. However, we are not requesting one at this time simply to reduce the work associated with our request.

We request the following combinations of requirements to be run:

1. 1955 LOD with Roe Island triggered and salmon protective measures
2. 1968 LOD with Roe Island triggered and salmon protective measures
- 2' 1968 LOD with Roe Island triggered and alternative salmon measures
- 2" 1968 LOD with Roe Island triggered, salmon protective measures and NMFS's winter-run opinion requirements
- 2''' 1968 LOD without Roc Island but with salmon protective measures

3. 1968 LOD with Roe Island but without salmon protective measures
4. 1975 LOD with Roe Island triggered and salmon protective measures
5. 1975 LOD without Roe Island but with salmon protective measures
6. salmon protective measures alone

The daily requirements for three levels of development are included in three LOTUS files on the enclosed diskette: 55loddays.txt, 68loddays.txt, and 75loddays.txt. The contents of these files are included as an attachment to this letter.

In all but the cases noted, please include the following salmon smolt protective measures, as we still believe that they represent a set of implementation measures which would approximate the level of protection appropriate:

Delta Cross Channel closed April through June

Total exports not above 1500 cfs for 4 weeks, April 15 May 15

Total exports for the rest of April through June not above 4000 cfs

Minimum Flows at Vernalis for four weeks (April 15 - May 15) as follows:

W 10,000 cfs; AN 8,000 cfs; BN 6,000 cfs; D 4,000 cfs; C 2,000 cfs

for alternative salmon protective measures in study 2' please use the same conditions except with 4,000 cfs minimum flows at Vernalis in both critical and dry years. For all San Joaquin requirements please use the San Joaquin River Index to establish year types.

We intend for these 9 runs to encompass the range of water costs addressed by EPA water quality standards although it may be that none of them exactly reflect the final determination. The highest priority is for the suite of conditions at 1968 LOD as these give the most information about the effect of structural differences in the standards.

In all cases please use a 6 MAF level of export demand in all years and a base condition of D-1485.

Trigger the Roe Island standard by reference to the best estimate of a 14 day moving average, as we have discussed for previous runs. Once triggered the requirement should remain in effect until less than .95 if a subsequent month is required. Thus, the standard might be triggered in February followed by requirements for all of March and some of April and May, in which case the requirement would be for X2 to be downstream of km 64 for all of February and March, at a location between km 64 and km 74 in April, but would not influence the requirement for May.

For the Chippis and Roe Island standards limit flow requirements to 11,400 and 29,200 cfs, respectively. For compliance with the confluence please rely on the modeled salinity, which may require increases in delta outflow in January of some years.

By presenting the requirements as monthly proportions we hope that we have facilitated the weighting that was used earlier to represent the required number of days in

DWRSIM's monthly time steps. In most cases the requirements are either very close to 1 or to zero; in these cases the standard would either require compliance at the site or at the next site upstream. At intermediate values the standard should be satisfied for the month at the proportionate distance downstream from the upstream site. Thus, if Roe Island is required .50 of the month of April in a given year, then the criteria to be met in DWRSIM should be at river km 79 (midway between the station and the next station upstream). Because the logarithmic relationship between flow and X2 location is contained in the model you are using to estimate flow needs this procedure should provide a good approximation.

We realize that these studies represent a substantial effort on DWR's part and we are grateful for this contribution to the development of standards that will protect the estuary with the smallest impact on other uses.

Regards,

*Thomas M. Herbold*

For Bruce Herbold

1955 L00 YEAR	CHIPPS Island					Roe Island				
	feb	mar	apr	may	jun	feb	mar	apr	may	jun
1907	1.00	1.00	1.00	1.00	1.00	0.87	0.97	1.00	1.00	0.00
1908	1.00	1.00	0.96	0.93	0.30	0.81	0.69	0.40	0.18	0.00
1909	1.00	1.00	1.00	1.00	0.99	0.99	0.98	0.83	0.86	0.00
1910	1.00	1.00	1.00	1.00	1.00	0.83	0.88	0.79	0.93	0.00
1911	1.00	1.00	1.00	1.00	1.00	0.94	0.91	0.97	0.99	0.00
1912	1.00	1.00	0.75	0.02	0.84	0.54	0.20	0.17	0.01	0.00
1913	1.00	1.00	0.46	0.98	0.83	0.68	0.23	0.09	0.30	0.00
1914	1.00	1.00	1.00	1.00	1.00	0.90	0.93	0.88	0.95	0.00
1915	1.00	1.00	1.00	1.00	1.00	0.74	0.97	0.80	0.89	0.00
1916	1.00	1.00	1.00	1.00	0.99	0.93	0.96	0.96	0.95	0.00
1917	1.00	1.00	1.00	1.00	0.99	0.45	0.87	0.38	0.87	0.00
1918	1.00	1.00	0.99	1.00	0.25	0.20	0.33	0.68	0.44	0.00
1919	1.00	1.00	0.99	1.00	0.97	0.54	0.87	0.61	0.78	0.00
1920	1.00	1.00	0.82	0.95	0.78	0.20	0.06	0.21	0.19	0.00
1921	1.00	1.00	1.00	1.00	0.97	0.94	0.87	0.89	0.55	0.00
1922	1.00	1.00	0.98	1.00	1.00	0.48	0.80	0.49	0.71	0.00
1923	1.00	1.00	0.67	1.00	0.93	0.72	0.32	0.14	0.39	0.00
1924	1.00	1.00	0.01	0.00	0.00	0.19	0.30	0.01	0.00	0.00
1925	1.00	1.00	0.99	1.00	0.94	0.41	0.96	0.39	0.76	0.00
1926	1.00	1.00	0.83	1.00	0.07	0.31	0.87	0.21	0.75	0.00
1927	1.00	1.00	1.00	1.00	0.98	0.81	0.98	0.80	0.94	0.00
1928	1.00	1.00	1.00	1.00	0.67	0.61	0.64	0.96	0.73	0.00
1929	1.00	1.00	0.42	0.03	0.23	0.23	0.28	0.08	0.01	0.00
1930	1.00	1.00	0.99	0.98	0.11	0.62	0.40	0.62	0.22	0.00
1931	1.00	1.00	0.31	0.00	0.00	0.34	0.12	0.06	0.00	0.00
1932	1.00	1.00	0.98	0.98	0.98	0.59	0.60	0.52	0.26	0.00
1933	1.00	1.00	0.89	0.31	0.19	0.28	0.06	0.28	0.94	0.00
1934	1.00	1.00	0.90	0.03	0.00	0.64	0.59	0.28	0.91	0.00
1935	1.00	1.00	0.95	1.00	0.99	0.75	0.49	0.37	0.99	0.00
1936	1.00	1.00	0.99	1.00	0.94	0.90	0.96	0.62	0.76	0.00
1937	1.00	1.00	1.00	1.00	1.00	0.18	0.75	0.75	0.75	0.00
1938	1.00	1.00	1.00	1.00	1.00	0.74	0.96	0.99	0.98	0.00
1939	1.00	1.00	0.90	0.75	0.00	0.33	0.14	0.28	0.09	0.00
1940	1.00	1.00	1.00	1.00	0.95	0.93	0.97	0.97	0.92	0.00
1941	1.00	1.00	1.00	1.00	1.00	0.94	0.96	0.92	0.92	0.00
1942	1.00	1.00	0.96	1.00	0.99	0.94	0.96	0.41	0.92	0.00
1943	1.00	1.00	1.00	1.00	0.92	0.95	0.83	0.95	0.86	0.00
1944	1.00	1.00	0.91	0.20	0.84	0.33	0.44	0.29	0.03	0.00
1945	1.00	1.00	0.95	0.98	0.95	0.48	0.93	0.39	0.30	0.00
1946	1.00	1.00	0.97	1.00	0.93	0.86	0.37	0.44	0.62	0.00
1947	1.00	1.00	0.98	0.48	0.04	0.24	0.49	0.53	0.08	0.00
1948	1.00	1.00	0.71	1.00	0.99	0.75	0.10	0.15	0.88	0.00
1949	1.00	1.00	1.00	1.00	0.88	0.18	0.18	0.76	0.53	0.00
1950	1.00	1.00	0.98	1.00	0.94	0.74	0.79	0.51	0.73	0.00
1951	1.00	1.00	0.99	0.98	0.75	0.91	0.90	0.58	0.30	0.00
1952	1.00	1.00	1.00	1.00	1.00	0.91	0.93	0.82	0.99	0.00
1953	1.00	1.00	0.94	1.00	0.86	0.96	0.47	0.33	0.52	0.00
1954	1.00	1.00	1.00	1.00	0.81	0.88	0.83	0.82	0.91	0.00
1955	1.00	1.00	0.40	0.32	0.79	0.52	0.20	0.68	0.04	0.00
1956	1.00	1.00	0.99	1.00	1.00	0.98	0.91	0.70	0.65	0.00
1957	1.00	1.00	1.00	0.85	0.96	0.33	0.80	0.78	0.12	0.00
1958	1.00	1.00	1.00	1.00	1.00	0.83	0.99	0.92	0.98	0.00
1959	1.00	1.00	0.92	0.77	0.01	0.81	0.78	0.31	0.10	0.00
1960	1.00	1.00	1.00	0.92	0.16	0.39	0.67	0.74	0.16	0.00
1961	1.00	1.00	0.91	0.39	0.07	0.37	0.69	0.29	0.05	0.00
1962	1.00	1.00	0.97	1.00	0.75	0.33	0.93	0.48	0.78	0.00
1963	1.00	1.00	0.94	1.00	1.00	0.71	0.95	0.36	0.98	0.00
1964	1.00	1.00	0.23	0.23	0.19	0.66	0.23	0.03	0.03	0.00
1965	1.00	1.00	0.92	1.00	0.95	0.97	0.73	0.31	0.93	0.00
1966	1.00	1.00	0.98	1.00	0.24	0.74	0.49	0.53	0.56	0.00
1967	1.00	1.00	1.00	1.00	1.00	0.91	0.78	0.88	0.78	0.00
1968	1.00	1.00	0.98	0.83	0.06	0.65	0.91	0.54	0.07	0.00
1969	1.00	1.00	1.00	1.00	1.00	0.98	0.95	0.77	0.97	0.00
1970	1.00	1.00	1.00	0.14	0.43	0.99	0.85	0.72	0.02	0.00
1971	1.00	1.00	1.00	1.00	0.98	0.89	0.60	0.83	0.60	0.00
1972	1.00	1.00	1.00	0.93	0.32	0.62	0.56	0.76	0.17	0.00
1973	1.00	1.00	1.00	1.00	0.99	0.94	0.91	0.75	0.44	0.00
1974	1.00	1.00	1.00	1.00	0.99	0.98	0.68	0.97	0.95	0.00
1975	1.00	1.00	1.00	0.99	1.00	0.43	0.84	0.92	0.34	0.00
1976	1.00	1.00	0.47	0.00	0.00	0.00	0.16	0.09	0.00	0.00
1977	1.00	1.00	0.00	0.00	0.00	0.15	0.04	0.00	0.00	0.00
1978	1.00	1.00	1.00	1.00	0.99	0.97	0.90	0.95	0.89	0.00
1979	1.00	1.00	0.99	0.97	0.99	0.63	0.69	0.66	0.23	0.00
1980	1.00	1.00	1.00	1.00	0.93	0.98	0.97	0.82	0.45	0.00
1981	1.00	1.00	0.98	0.82	0.05	0.67	0.57	0.51	0.11	0.00
1982	1.00	1.00	1.00	1.00	1.00	0.91	0.97	0.92	1.00	0.00
1983	1.00	1.00	1.00	1.00	1.00	0.94	0.68	1.00	0.94	0.00
1984	1.00	1.00	0.99	0.92	0.92	0.68	0.73	0.71	0.17	0.00
1985	1.00	1.00	0.74	0.98	0.06	0.36	0.32	0.17	0.29	0.00
1986	1.00	1.00	1.00	1.00	0.91	0.65	1.00	0.98	0.49	0.00
1987	1.00	1.00	0.98	0.07	0.00	0.32	0.47	0.54	0.02	0.00
1988	1.00	1.00	0.38	0.01	0.00	0.74	0.22	0.08	0.01	0.00

1968 LOO YEAR	CHIPPS Island					Roe Island				
	feb	mar	apr	may	jun	feb	mar	apr	may	jun
1907	1.00	1.00	1.00	1.00	1.00	0.89	0.96	0.59	0.99	0.00
1908	1.00	1.00	0.91	0.55	0.06	0.83	0.55	0.21	0.06	0.00
1909	1.00	1.00	1.00	1.00	0.97	0.99	0.97	0.66	0.65	0.00
1910	1.00	1.00	1.00	1.00	0.43	0.89	0.67	0.84	0.65	0.00
1911	1.00	1.00	1.00	1.00	0.99	0.95	0.84	0.92	0.97	0.00
1912	1.00	0.98	0.59	0.00	0.45	0.57	0.12	0.08	0.00	0.00
1913	1.00	0.99	0.29	0.84	0.43	0.71	0.14	0.04	0.12	0.00
1914	1.00	1.00	1.00	1.00	0.99	0.99	0.87	0.75	0.86	0.00
1915	1.00	1.00	1.00	1.00	1.00	0.77	0.94	0.62	0.72	0.00
1916	1.00	1.00	1.00	1.00	0.93	0.93	0.92	0.91	0.86	0.30
1917	1.00	1.00	0.90	1.00	0.92	0.48	0.78	0.20	0.68	0.00
1918	1.00	1.00	0.99	0.95	0.05	0.22	0.21	0.46	0.20	0.00
1919	1.00	1.00	0.98	1.00	0.85	0.58	0.78	0.38	0.52	0.00
1920	1.00	0.03	0.68	0.61	0.35	0.22	0.03	0.09	0.07	0.00
1921	1.00	1.00	1.00	0.98	0.84	0.95	0.78	0.76	0.27	0.00
1922	1.00	1.00	0.95	0.99	1.00	0.52	0.69	0.27	0.43	0.00
1923	1.00	1.00	0.49	0.98	0.67	0.75	0.20	0.06	0.31	0.00
1924	1.00	1.00	0.00	0.00	0.00	0.22	0.19	0.00	0.00	0.00
1925	1.00	1.00	0.91	1.00	0.70	0.45	0.93	0.20	0.50	0.00
1926	1.00	1.00	0.70	1.00	0.01	0.35	0.79	0.10	0.48	0.00
1927	1.00	1.00	1.00	1.00	0.91	0.83	0.96	0.61	0.82	0.00
1928	1.00	1.00	1.00	1.00	0.23	0.64	0.49	0.91	0.46	0.00
1929	1.00	1.00	0.26	0.00	0.04	0.25	0.18	0.03	0.00	0.00
1930	1.00	1.00	0.98	0.68	0.02	0.65	0.45	0.39	0.08	0.00
1931	1.00	0.71	0.18	0.00	0.00	0.37	0.07	0.03	0.00	0.00
1932	1.00	1.00	0.96	0.77	0.88	0.62	0.45	0.30	0.10	0.00
1933	1.00	0.02	0.81	0.04	0.03	0.31	0.03	0.13	0.01	0.00
1934	1.00	1.00	0.81	0.00	0.00	0.67	0.36	0.13	0.00	0.00
1935	1.00	1.00	0.90	1.00	0.96	0.77	0.35	0.19	0.96	0.00
1936	1.00	1.00	0.98	1.00	0.71	0.91	0.93	0.39	0.50	0.00
1937	1.00	1.00	0.99	1.00	0.98	0.21	0.62	0.55	0.47	0.00
1938	1.00	1.00	1.00	1.00	1.00	0.77	0.94	0.97	0.95	0.00
1939	1.00	0.84	0.81	0.20	0.00	0.36	0.08	0.13	0.03	0.00
1940	1.00	1.00	1.00	1.00	0.74	0.94	0.95	0.93	0.77	0.00
1941	1.00	1.00	1.00	1.00	0.99	0.95	0.95	0.83	0.77	0.00
1942	1.00	1.00	0.92	1.00	0.97	0.95	0.93	0.22	0.78	0.00
1943	1.00	1.00	1.00	1.00	0.63	0.96	0.73	0.88	0.66	0.00
1944	1.00	1.00	0.83	0.02	0.45	0.36	0.30	0.14	0.01	0.00
1945	1.00	1.00	0.91	0.84	0.76	0.52	0.88	0.20	0.12	0.00
1946	1.00	1.00	0.93	0.99	0.69	0.87	0.25	0.24	0.33	0.00
1947	1.00	1.00	0.96	0.16	0.01	0.27	0.35	0.31	0.03	0.00
1948	1.00	0.33	0.54	1.00	0.94	0.78	0.06	0.07	0.69	0.00
1949	1.00	0.97	0.99	0.97	0.49	0.20	0.11	0.56	0.26	0.00
1950	1.00	1.00	0.96	1.00	0.71	0.76	0.67	0.29	0.66	0.00
1951	1.00	1.00	0.97	0.83	0.32	0.92	0.83	0.35	0.11	0.00
1952	1.00	1.00	1.00	1.00	1.00	0.92	0.88	0.65	0.97	0.00
1953	1.00	1.00	0.88	0.97	0.48	0.97	0.33	0.17	0.25	0.00
1954	1.00	1.00	1.00	1.00	0.40	0.83	0.73	0.43	0.76	0.00
1955	1.00	0.99	0.25	0.04	0.37	0.56	0.12	0.03	0.01	0.00
1956	1.00	1.00	0.99	0.99	0.99	0.96	0.85	0.48	0.36	0.00
1957	1.00	1.00	0.99	0.32	0.78	0.37	0.69	0.58	0.04	0.00
1958	1.00	1.00	1.00	1.00	1.00	0.85	0.98	0.83	0.95	0.00
1959	1.00	1.00	0.85	0.22	0.00	0.83	0.66	0.15	0.03	0.00
1960	1.00	1.00	0.99	0.50	0.03	0.43	0.78	0.53	0.06	0.00
1961	1.00	1.00	0.83	0.05	0.01	0.40	0.56	0.14	0.01	0.00
1962	1.00	1.00	0.95	1.00	0.31	0.36	0.88	0.27	0.52	0.00
1963	1.00	1.00	0.89	1.00	0.98	0.74	0.91	0.18	0.92	0.00
1964	1.00	0.99	0.14	0.03	0.03	0.70	0.14	0.02	0.01	0.00
1965	1.00	1.00	0.84	1.00	0.76	0.97	0.39	0.15	0.80	0.00
1966	1.00	1.00	0.96	0.98	0.05	0.77	0.33	0.31	0.28	0.00
1967	1.00	1.00	1.00	1.00	1.00	0.92	0.66	0.74	0.49	0.00
1968	1.00	1.00	0.97	0.13	0.01	0.68	0.85	0.32	0.02	0.00
1969	1.00	1.00	0.99	1.00	1.00	0.99	0.92	0.57	0.91	0.00
1970	1.00	1.00	0.99	0.91	0.11	0.99	0.76	0.50	0.01	0.00
1971	1.00	1.00	1.00	0.99	0.89	0.90	0.45	0.66	0.31	0.00
1972	1.00	1.00	0.99	0.53	0.07	0.65	0.41	0.33	0.06	0.00
1973	1.00	1.00	0.99	0.95	0.97	0.94	0.85	0.55	0.19	0.00
1974	1.00	1.00	1.00	1.00	0.96	0.98	0.54	0.93	0.86	0.00
1975	1.00	1.00	1.00	0.88	0.99	0.48	0.75	0.82	0.14	0.00
1976	1.00	0.94	0.30	0.00	0.00	0.27	0.10	0.04	0.00	0.00
1977	1.00	0.00	0.00	0.00	0.00	0.17	0.02	0.00	0.00	0.00
1978	1.00	1.00	1.00	1.00	0.96	0.97	0.83	0.89	0.71	0.00
1979	1.00	1.00	0.98	0.72	0.94	0.66	0.54	0.43	0.09	0.00
1980	1.00	1.00	1.00	0.95	0.68	0.98	0.95	0.64	0.20	0.00
1981	1.00	1.00	0.96	0.27	0.01	0.70	0.42	0.29	0.04	0.00
1982	1.00	1.00	1.00	1.00	0.99	0.53	0.95	0.83	0.99	0.00
1983	1.00	1.00	1.00	1.00	1.00	0.95	0.96	0.99	0.83	0.00
1984	1.00	1.00	0.99	0.51	0.64	0.89	0.60	0.49	0.06	0.00
1985	1.00	1.00	0.58	0.82	0.01	0.39	0.21	0.07	0.11	0.00
1986	1.00	1.00	1.00	0.97	0.61	0.87	0.99	0.96	0.23	0.00
1987	1.00	1.00	0.97	0.01	0.00	0.36	0.33	0.32	0.01	0.00

1975 LUD	CHIPPS Island					Roe Island				
YEAR	feb	mar	apr	may	jun	feb	mar	apr	may	jun
1907	1.00	1.00	1.00	1.00	0.99	0.90	0.94	0.98	0.97	0.00
1908	1.00	1.00	0.88	0.24	0.02	0.84	0.47	0.14	0.03	0.00
1909	1.00	1.00	1.00	1.00	0.92	0.99	0.98	0.54	0.50	0.00
1910	1.00	1.00	1.00	1.00	0.21	0.90	0.59	0.76	0.49	0.00
1911	1.00	1.00	1.00	1.00	0.98	0.95	0.79	0.87	0.94	0.00
1912	1.00	0.00	0.50	0.00	0.23	0.59	0.09	0.05	0.00	0.00
1913	1.00	0.00	0.22	0.57	0.22	0.73	0.10	0.02	0.06	0.00
1914	1.00	1.00	1.00	1.00	0.97	0.99	0.83	0.65	0.76	0.00
1915	1.00	1.00	0.99	1.00	0.99	0.78	0.92	0.50	0.58	0.00
1916	1.00	1.00	1.00	1.00	0.84	0.94	0.90	0.86	0.76	0.00
1917	1.00	1.00	0.86	1.00	0.81	0.50	0.72	0.13	0.53	0.00
1918	1.00	0.06	0.98	0.83	0.02	0.24	0.16	0.34	0.11	0.00
1919	1.00	1.00	0.97	0.99	0.68	0.59	0.72	0.27	0.37	0.00
1920	1.00	0.00	0.60	0.29	0.17	0.24	0.03	0.06	0.04	0.00
1921	1.00	1.00	1.00	0.92	0.65	0.95	0.72	0.65	0.16	0.00
1922	1.00	1.00	0.93	0.98	1.00	0.54	0.61	0.19	0.28	0.00
1923	1.00	0.05	0.40	0.94	0.43	0.76	0.16	0.04	0.19	0.00
1924	1.00	0.03	0.00	0.00	0.00	0.23	0.14	0.00	0.00	0.00
1925	1.00	1.00	0.87	0.99	0.46	0.47	0.90	0.13	0.34	0.00
1926	1.00	1.00	0.62	0.99	0.00	0.36	0.73	0.06	0.33	0.00
1927	1.00	1.00	0.99	1.00	0.78	0.84	0.94	0.49	0.71	0.00
1928	1.00	0.99	1.00	0.98	0.10	0.66	0.41	0.85	0.31	0.00
1929	1.00	0.02	0.19	0.00	0.02	0.27	0.13	0.02	0.00	0.00
1930	1.00	0.98	0.97	0.36	0.01	0.67	0.38	0.28	0.94	0.00
1931	1.00	0.00	0.13	0.00	0.00	0.39	0.05	0.02	0.00	0.00
1932	1.00	0.98	0.94	0.47	0.73	0.64	0.37	0.21	0.95	0.00
1933	1.00	0.00	0.74	0.01	0.01	0.32	0.02	0.08	0.01	0.00
1934	1.00	0.22	0.74	0.00	0.00	0.69	0.29	0.08	0.00	0.00
1935	1.00	0.76	0.86	1.00	0.91	0.79	0.28	0.13	0.92	0.00
1936	1.00	1.00	0.97	0.99	0.47	0.92	0.90	0.28	0.34	0.00
1937	1.00	1.00	0.99	0.99	0.94	0.22	0.55	0.42	0.32	0.00
1938	1.00	1.00	1.00	1.00	1.00	0.78	0.92	0.94	0.91	0.00
1939	1.00	0.00	0.75	0.06	0.00	0.38	0.06	0.09	0.02	0.00
1940	1.00	1.00	1.00	1.00	0.51	0.94	0.93	0.89	0.64	0.00
1941	1.00	1.00	1.00	1.00	0.99	0.95	0.91	0.74	0.64	0.00
1942	1.00	1.00	0.89	1.00	0.91	0.95	0.91	0.15	0.65	0.00
1943	1.00	1.00	1.00	1.00	0.39	0.94	0.64	0.82	0.50	0.00
1944	1.00	0.48	0.77	0.01	0.23	0.38	0.24	0.09	0.00	0.00
1945	1.00	1.00	0.87	0.58	0.54	0.54	0.85	0.13	0.07	0.00
1946	1.00	0.17	0.91	0.96	0.43	0.88	0.19	0.16	0.21	0.00
1947	1.00	0.78	0.95	0.05	0.00	0.28	0.28	0.21	0.01	0.00
1948	1.00	0.00	0.45	1.00	0.86	0.79	0.04	0.04	0.55	0.00
1949	1.00	0.00	0.99	0.91	0.26	0.21	0.08	0.44	0.16	0.00
1950	1.00	1.00	0.94	0.98	0.48	0.78	0.59	0.20	0.31	0.00
1951	1.00	1.00	0.96	0.57	0.14	0.93	0.78	0.25	0.06	0.00
1952	1.00	1.00	1.00	1.00	1.00	0.93	0.84	0.53	0.94	0.00
1953	1.00	0.67	0.83	0.90	0.26	0.97	0.26	0.11	0.15	0.00
1954	1.00	1.00	0.99	1.00	0.20	0.94	0.66	0.53	0.62	0.00
1955	1.00	0.00	0.18	0.01	0.17	0.58	0.09	0.02	0.01	0.00
1956	1.00	1.00	0.98	0.96	0.96	0.98	0.81	0.36	0.23	0.00
1957	1.00	1.00	0.99	0.11	0.56	0.38	0.62	0.46	0.02	0.00
1958	1.00	1.00	1.00	1.00	1.00	0.86	0.97	0.74	0.91	0.00
1959	1.00	1.00	0.79	0.07	0.00	0.24	0.58	0.10	0.02	0.00
1960	1.00	1.00	0.99	0.21	0.01	0.45	0.72	0.41	0.03	0.00
1961	1.00	1.00	0.76	0.01	0.00	0.42	0.48	0.09	0.01	0.00
1962	1.00	1.00	0.93	0.99	0.14	0.33	0.84	0.18	0.37	0.00
1963	1.00	1.00	0.85	1.00	0.94	0.75	0.88	0.12	0.87	0.00
1964	1.00	0.00	0.10	0.01	0.01	0.71	0.11	0.81	0.01	0.00
1965	1.00	1.00	0.79	1.00	0.53	0.97	0.51	0.10	0.68	0.00
1966	1.00	0.76	0.95	0.93	0.02	0.78	0.28	0.21	0.17	0.00
1967	1.00	1.00	1.00	0.99	0.99	0.92	0.59	0.63	0.34	0.00
1968	1.00	1.00	0.95	0.04	0.00	0.79	0.80	0.22	0.01	0.00
1969	1.00	1.00	0.99	1.00	1.00	0.99	0.89	0.45	0.84	0.00
1970	1.00	1.00	0.99	0.00	0.04	0.99	0.70	0.38	0.00	0.00
1971	1.00	0.98	1.00	0.95	0.74	0.91	0.37	0.54	0.19	0.00
1972	1.00	0.94	0.99	0.23	0.03	0.67	0.34	0.43	0.03	0.00
1973	1.00	1.00	0.99	0.82	0.91	0.95	0.80	0.42	0.11	0.00
1974	1.00	1.00	1.00	1.00	0.90	0.98	0.46	0.89	0.77	0.00
1975	1.00	1.00	1.00	0.66	0.97	0.51	0.68	0.73	0.98	0.00
1976	1.00	0.00	0.23	0.00	0.00	0.28	0.07	0.02	0.00	0.00
1977	1.00	0.00	0.00	0.00	0.00	0.18	0.01	0.00	0.00	0.00
1978	1.00	1.00	1.00	1.00	0.90	0.98	0.78	0.82	0.57	0.00
1979	1.00	1.00	0.98	0.40	0.86	0.68	0.46	0.32	0.05	0.00
1980	1.00	1.00	0.99	0.84	0.44	0.98	0.94	0.52	0.12	0.00
1981	1.00	0.96	0.94	0.09	0.00	0.72	0.35	0.20	0.02	0.00
1982	1.00	1.00	1.00	1.00	0.98	0.93	0.93	0.75	0.99	0.00
1983	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.98	0.72	0.00
1984	1.00	1.00	0.98	0.22	0.39	0.90	0.52	0.37	0.03	0.00
1985	1.00	0.05	0.48	0.54	0.00	0.41	0.16	0.05	0.06	0.00
1986	1.00	1.00	1.00	0.88	0.36	0.88	0.99	0.93	0.14	0.00
1987	1.00	0.65	0.95	0.00	0.00	0.37	0.26	0.22	0.00	0.00