

Oklahoma Agricultural Experiment Station,

BULLETIN NO. 38.

April, 1899.

Analyses of Waters for Irrigation.

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Analyses of Waters for Irrigation.

SUMMARY.

1. The water of the Salt Fork of the Arkansas and of the Cimarron river is unfit to be used for irrigation except in very limited amounts.
2. The water of the North Canadian and of the South Canadian may be safely used for irrigation.
3. None of the smaller streams that have been examined, except the Black Bear, are unfit to be used for irrigation.
4. Well waters vary greatly in the amount and character of the dissolved mineral matter which they contain and should be analyzed before being arranged to be used for irrigation.
5. A partial survey of the conditions which must be met in the construction of reservoirs for the retention of storm river waters has been made and it is not clear that this method is entirely feasible in all cases.

Attention is again called to the desirability of always corresponding with the Station before sending samples for analysis. The examination of waters for irrigation and for domestic use is considered a part of the work of the Chemical department of the Station and will be continued in the future under the regulations which have been found necessary. Samples sent without previous arrangement cannot be analyzed

The condensed statements which follow show the results of the work done on river and creek waters up to this date, including that published in "Bulletin 29". Full analytical data follow this summary and those wishing specific information about a given well or stream are referred to the tables.

Cimarron River. Seven samples at points from Waynoka to Perkins. Except one taken during flood, all certainly unfit for irrigation water.

Salt Fork of Arkansas. Three samples, Alva, Pond Creek, and Ponca. First may be used in limited amounts for irrigation, others unfit.

Canadian River. Three samples; Taloga, south of El Reno, and Noble. All of fair quality for irrigation.

North Fork of Canadian. Six samples at points from Woodward to Sweeney. All of fair quality for irrigation.

Black Bear Creek. Two samples at crossing north of Stillwater. Unsafe except on well drained, sandy soils.

Stillwater Creek. Two samples; quality good.

Arkansas and Chicaskia Rivers. One sample each, quality good.

Boomer, Cottonwood, Council, Deer, Little Stillwater, Red Rock, Salt, and Wild Horse Creeks. One sample each; quality good.

Wells and Springs. Of twenty examined and not previously reported, fourteen could be used for irrigation and six were positively unfit.

RECORD OF SAMPLES.

788. Well, 32 feet deep, S. E. $\frac{1}{4}$ section 36, range 4, e., $\frac{1}{2}$ mile west of Pawnee. M. M. Holmes, Pawnee. 9—23—'97.
832. Well, 6 in. diam., 59 ft. to water, 15 feet of water, s. w. $\frac{1}{4}$ sec. 23, T. 12, r. 1e. L. H. North, Sweeney. 11—6—'97.
833. North Fork of Canadian river; 25 ft. wide, 1 foot deep. Sampled near 832. L. H. North, Sweeney. 11—6—'97.
852. Well, 1 ft. diam., 70 ft. to water, 15 ft. of water, N. E. $\frac{1}{4}$ sec. 14, T. 17, r 2e. J. P. Hinkel, Perkins. 11—30—'97.
854. Well, 4 $\frac{1}{2}$ ft. diam., 23 ft. to water, 5 ft of water. G. E. Morrow, Stillwater. 12—1—'97.
889. Well, 5 feet diam., 30 ft. to water, 4 ft. of water, N. E. $\frac{1}{4}$ sec. 6, T. 28 R. 2e. L. Cummings, Newkirk. 12—25—'97.
890. Well, 3 $\frac{1}{2}$ feet diam., 20 ft. to water, 10 ft. of water, N. E. $\frac{1}{4}$ Sec. 4, T. 12, R. 4w. Jas. L. Brown, Oklahoma City, 1—5—'98.
- 891—Branch of Deer Creek, sampled near 890; 12 to 20 feet wide, 6 in. to 2 ft. deep. Jas. L. Brown, Oklahoma City. 1—5—'98.
1101. Spring, S. E. $\frac{1}{4}$ sec. 9, T. 16, R. 9 w.; runs into Otter Creek. Wm. Wadsworth, Omega. 4—11—'98,
1120. Well, 6 in. diam. 50 ft. to water, 20 ft. of water, N. W. $\frac{1}{4}$, sec. 22, T. 21; R. 1w. E. T. Oden, Perry. 3—25—'98.

- A. Stillwater Creek, $\frac{1}{2}$ mile south of Stillwater, at low water; clear, 10 feet wide, 3 feet deep. 3-9-'98.
- B. Boomer Creek, $\frac{1}{4}$ mile east of Stillwater. low water, clear, 20 feet wide, 4 feet deep. 3-9-'98.
- C. Council Creek, $3\frac{1}{2}$ miles n. w. Ingalls, 15 ft. wide, muddy, running swiftly. 3-10-'98.
- D. Little Stillwater Creek, 6 mi. east of Stillwater, 8 feet wide; shallow, muddy: 3-10-'98.
- E. Salt Creek, 10 miles n. e. of Ingalls, 12 feet wide, 3 feet deep, clear. 3-13-'98.
- F. Wild Horse Creek, 11 miles S. W. of Stillwater, 8 feet wide, shallow, clear. 3-20-'98.
- G. Well, 6 feet diam. 23 ft. to water, 7 feet of water. Joseph Hopping, 11 mi. S. W. Stillwater. 3-20-'98.
- I. Cimarron River, $2\frac{1}{2}$ miles S. E. of Perkins, Stream up, muddy, 125 yds. wide, 6 feet deep. 3-20-'98,
- J. Stillwater Creek, $\frac{1}{2}$ mile south of Stillwater, out of banks, very muddy, running swiftly.
- K. Cimarron river, at crossing south of Perkins, very high and muddy, 275 yards wide, 10 feet deep.
1128. Well, 7 inches in diam. 95 ft. to water, 6 feet of water. J. L. Bi-hop, $1\frac{1}{2}$ mile west of Jennings. 6-16-'98.
1129. Well, 25 feet deep. W. J. Hamilton, Stillwater.
1174. Well, sec. 9, T. 12, range 4 west. Jas. L. Brown, Oklahoma City. 4-30-'98.
1175. Well, Sec. 9, township 12, range 4 west. Jas. L. Brown Oklahoma City. 4-30-'98.
1176. Well, sec. 33, township 12, range 3 west. Jas. L. Brown Oklahoma City. 4-30-'98.
1177. Well. Section 33, Town. 12, range 3 west. J. L. Brown. Oklahoma City. 4-30-'98.
1191. Well, 29 in. diam. 10 ft. to water, 37 feet of water, N. E. $\frac{1}{4}$ section 14, township 21, range 6e. N. R. Duffield, Valley. 9-11-'98.
1195. Salt Fork of Arkansas, $\frac{1}{2}$ mile east of Pond Creek. 9-1-'98.
1196. Cimarron River, 8 miles north of Kingfisher, very low, 9-2-'98.
1197. Canadian River, 11 miles south of El Reno, very low. 9-3-'98.
1198. North Fork of Canadian River, 2 mi. North of El Reno. 9-3-'98.

1199. North Fork of Canadian River, 1 mile south of Oklahoma City. 9-4-'98.
1200. Cimarron River, 2 miles north of Guthrie, very low. 9-4-'98.
1201. Cottonwood Creek, $\frac{1}{2}$ mi. north of Guthrie. 9-4-'98.
1204. Canadian River at Noble, very low. 9-4-'98.
1321. Well, 3 ft. diam., 15 ft. to water, 6 ft. of water, N. W. $\frac{1}{4}$ sec. 8, T. 20, R. 2 E. R. G. McCain, Stillwater. 10-28-98.
1324. Black Bear Creek, at crossing N. of Stillwater. 10-29-98.
1344. North Fork of Canadian River at Woodward. 8-28-98.
1345. Well, 20 ft. deep. Chas. B. Young, Woodward. 8-29-98.
1346. Spring, $1\frac{1}{2}$ mi. S. W. of Woodward, town water supply. 8-29-98.
1347. Cimarron River, 4 mi. S. W. of Waynoka, very low. 8-29-98.
1348. Dog Creek at Waynoka. 8-29-98.
1349. Salt Fork of Arkansas, at Alva. Very low. 8-30-98.
1350. Spring, 2 mi. N. of Alva, town water supply. 8-30-98.

COMPOSITION OF SOLIDS. --Parts Per 100,000.

Sample No.	Tot'l Solids	Chlorin	Ca O.	Mg O.	S O ₃	Water Sol'ble CO ₂	Insoluble CO ₂ .	*White Alkali	† Black Alkali
788	292.0	15.6	34.4	27.1	108.9	0.2	15.9	202.6	0.5
832	16.4	2.4	2.8	1.1	0.5	1.3	2.9	4.7	3.1
833	62.2	10.8	10.6	5.4	6.7	1.1	9.9	27.8	2.7
852	146.6	54.0	16.5	14.5	11.6	0.4	10.6	108.4	1.0
854	20.4	1.2	5.8	1.6	0.4	1.3	5.5	2.7	3.1
889	81.0	0.6	18.6	6.4	25.1	0.4	11.0	41.6	1.0
890	227.6	3.0	43.8	11.7	92.7	0.4	10.6	165.1	1.0
891	143.0	2.4	28.2	7.4	51.7	0.7	9.4	99.1	1.2
1101	46.0	6.3	†	†	†	2.0	9.4	†	†
1120	785.6	179.1	127.9	28.0	274.2	1.2	1.1	726.4	2.9
A	94.4	7.2	14.1	7.7	14.7	4.4	16.2	37.3	10.6
B	61.1	1.8	13.6	5.1	6.0	4.5	12.6	11.7	10.9
C	24.0	1.2	3.3	3.0	0.3	1.9	6.0	2.5	3.5
D	39.8	1.3	6.7	2.7	0.0	2.7	10.4	6.1	6.6
E	25.9	1.3	5.4	3.9	0.0	1.3	9.0	2.1	3.2
F	55.1	3.1	6.8	6.2	0.0	4.4	11.8	5.5	10.6
G	17.7	2.0	3.8	1.6	0.0	1.1	4.7	3.2	2.6
I	681.2	371.9	24.4	8.4	30.4	0.4	6.6	647.2	1.1
J	17.2	0.4	2.6	1.5	1.8	0.7	3.1	3.5	1.6
K	128.1	59.4	14.5	2.0	12.8	0.4	3.2	119.1	1.1
1128	50.6	2.1	6.1	2.3	2.8	9.2	4.4	7.6	22.2
1129	37.2	0.8	6.1	2.8	0.8	6.0	5.6	4.1	14.5
1174	37.6	3.9	8.2	2.6	3.3	3.5	5.3	11.2	8.5
1175	65.4	4.3	11.2	6.3	14.0	2.2	11.2	30.4	5.3
1176	37.5	0.6	13.6	0.7	2.0	3.3	9.9	4.3	8.0
1177	76.7	17.0	13.9	6.8	10.9	2.0	10.3	50.1	2.8
1191	232.4	104.4	14.8	4.8	14.0	0.7	10.3	199.0	1.7
1195	596.2	306.0	13.6	5.5	42.8	0.5	4.7	579.4	1.2
1196	1139.2	610.2	41.2	16.6	58.7	1.3	4.4	1116.5	3.1
1197	125.2	8.4	29.9	9.0	57.0	0.9	3.5	104.4	2.1
1198	99.5	24.0	11.9	7.8	20.2	0.9	5.7	77.5	2.2
1199	82.6	18.0	17.4	6.5	16.6	0.9	8.3	56.5	2.2
1200	794.0	421.2	31.0	11.4	23.6	1.0	5.2	740.4	2.4
1201	29.8	4.2	5.3	2.0	6.0	0.7	4.6	16.4	1.6
1204	64.7	7.8	10.8	4.8	15.8	1.1	7.2	38.0	2.7
1321	56.7	4.2	10.8	5.9	7.8	3.1	9.2	18.0	7.5
1324	49.9	2.4	10.4	2.8	1.1	7.0	9.5	4.8	16.9
1344	90.9	25.5	10.8	4.9	16.3	0.6	6.4	68.0	1.4
1345	168.7	32.4	43.8	6.3	48.8	1.4	9.9	134.7	3.4
1346	28.9	1.5	†	†	1.5	1.0	5.5	†	†
1347	721.0	399.0	15.2	1.8	21.2	1.0	8.0	694.3	2.4
1348	61.6	3.6	12.4	6.2	12.9	1.2	9.4	25.7	2.9
1349	163.3	11.1	38.0	8.7	61.1	0.8	3.6	119.3	1.9
1350	25.1	1.6	6.4	2.0	2.1	0.9	5.5	5.2	2.2

Samples 1120 and A to K were analyzed by N. T. Gilbert.

Samples 1128 to 1350 were analyzed by A. G. Ford.

* 'White alkali' includes calcium sulfate and chlorid, magnesium sulfate and chlorid, and sodium sulfate and chlorid.

† 'Black alkali' is sodium carbonate.

‡ Not determined.

Waters containing more than 100 parts of white or 10 parts of black alkali per 100,000 are not considered desirable for irrigation.

