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STATUS REPORT ON FIELD

INVESTIGATIONS PROGRAM

MAY, 1974

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STATUS REPORT ON FIELD INVESTIGATIONS PROGRAM
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The Field Investigations Program has undergone several dramatic changes within the past twelve months. The Program, which is essentially divided into two subprograms, i.e., routine monitoring and special investigations, has had an almost 100 percent turnover in personnel and has added two new positions. At present, the program is organized as pictured in Figure I.

ROUTINE MONITORING

With the hiring and placement of four engineering technicians in the Northwest, Northeast, Southwest and Main offices in March of this year, the monitoring program is now set up to increase its sampling capabilities by approximately 350 percent over the next two years. Projected sampling frequencies as compared with 1973 figures are given in Table 1.

TABLE 1

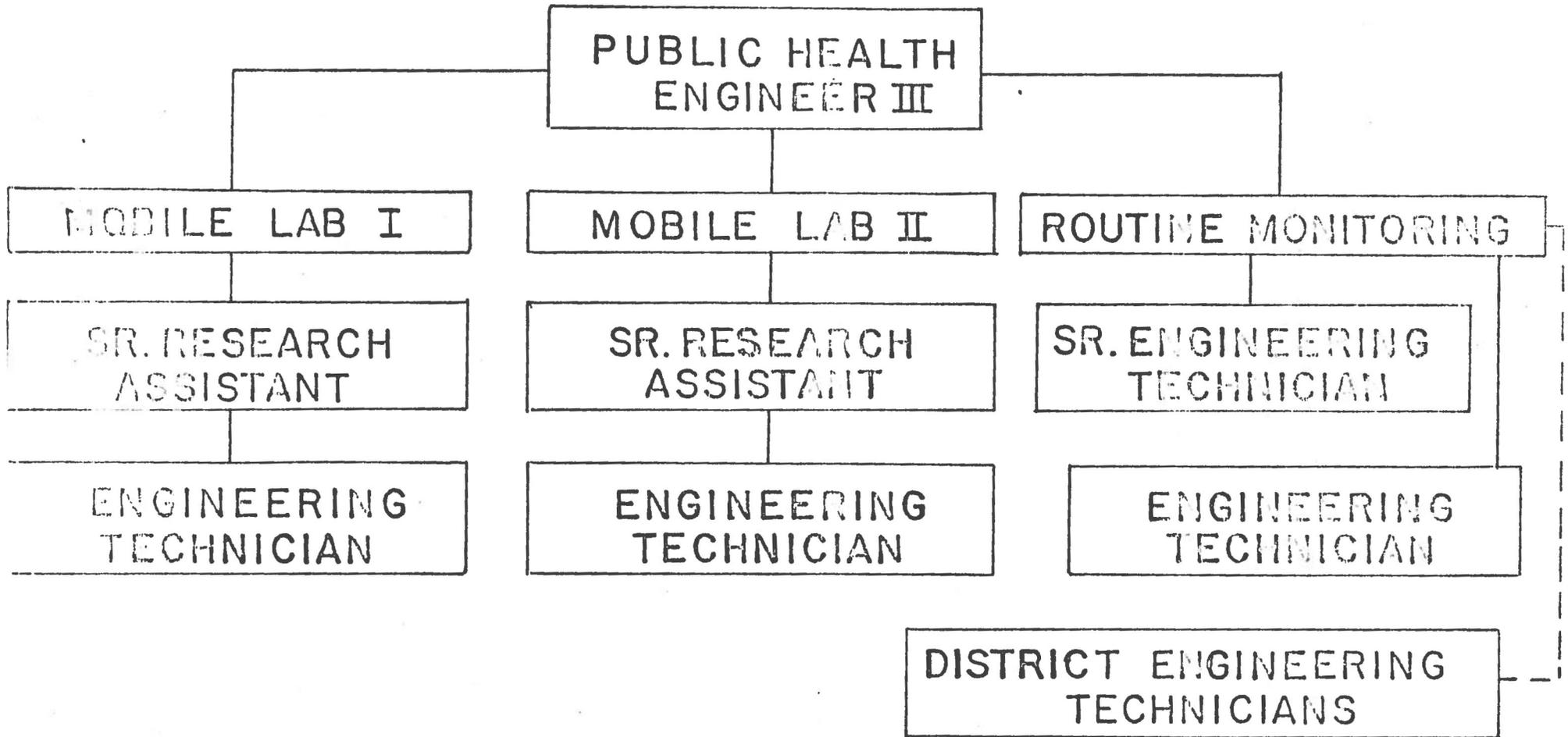
Projected Number of Samples to be Collected in
Routine Monitoring Program during 1974-75 as Compared with 1973

	1973	<u>YEAR</u> <u>1974</u>	1975
Stream	419	1,315	2,210
Effluent	430	600	800
Total	849	1,915	3,010

The stream monitoring program is operating a system of 127 permanent water quality sampling stations. These are divided into a primary network of 27 stations which are sampled weekly and a secondary network of 100 stations which are sampled quarterly. The former being stations whose water quality parameters may vary due to pollutional effects while the latter's characteristics are more likely to be governed by seasonal climatological variations. Details on the parameters

FIGURE I

FIELD INVESTIGATIONS UNIT



sampled and the locations of the stations are contained in Appendix A. It should be noted that while the network of 127 stations has been in effect for over two years, the lack of manpower has not allowed the primary-secondary frequencies of sampling to go into effect until April, 1974.

Table 2 shows that 419 samples were taken from the 127 water quality sampling stations during 1973 with 65 or 15.5 percent of these samples being in violation of water quality standards. Of the violations nearly one-half were for pH's greater than 8.5.

TABLE 2
Routine Monitoring Statistics for 1973

Type of Monitoring	Number of Stations	Total Number of Samples	Number of Parameters Analyzed	Number of Samples in Violation	% Samples in Violation
Stream	127	419	14,665	65 *	15.5
Effluent	250	430	4,300	380	88.4

* 32 of the 65 samples were in violation of pH Standards

The effluent monitoring program is generally set up to sample each discharger a minimum of twice annually. As can be seen from Table 1, 430 samples were collected in 1973. This number of samples represents 250 dischargers out of a list of 398 present and potential dischargers; i.e., the 398 includes those entities which may discharge in the future or are doing so on an intermittent basis at present. It is hoped to increase the number of samples to a minimum of 600 during 1974 and to a minimum of 800 in 1975.

As can be seen from Table 2, 380 or 88.4 percent of the 430 samples collected from treatment plants during 1973 were in violation of state discharge standards.

In the past, some of the local health departments have conducted a sampling program of their own, which in many instances has duplicated the

efforts of the Water Quality Control Division. Arrangements are now being made for those local departments which are willing and have adequate laboratory facilities to conduct the effluent monitoring program for the Division within their counties. The stream monitoring program, which requires more sophisticated analytical equipment, will continue to be handled solely by the Division.

SPECIAL INVESTIGATIONS

Special investigations are carried out for a variety of reasons. Some of these are:

1. Determination of patterns of pollution down stream from waste dischargers and its effect on water uses;
2. Determination of adherence to or violation of water quality standards;
3. Estimation of the waste assimilative capacities of streams in order to determine appropriate effluent standards for dischargers;
4. Determination of causes of fish kills or other disasters involving deterioration of water quality;
5. Determination of baseline water quality and biological characteristics of streams.

The majority of special investigations are carried out by the Division's mobile laboratory team of an aquatic biologist and engineering technician. By mid-June of this year, it is hoped that a second team and mobile laboratory will be in operation.

The past year has seen only a limited number of investigations carried out. This was primarily due to the nine month time lag in hiring an aquatic biologist to head the mobile lab after the untimely death in December, 1972,

of the chemist in charge. Surveys were conducted on the Roaring Fork, Colorado and San Miguel Rivers with a partially completed study of the Gunnison River still in progress. With the addition of the second mobile unit, it is hoped to conduct twelve surveys during fiscal year 1974-75. A tentative schedule of these surveys are given in Table 3.

TABLE 3

Proposed 1974-75 Special
Investigations Schedule

<u>Area of Investigation</u>	<u>Dates</u>	<u>Mobile Unit</u>
Gunnison River Basin	Cont'd-Aug. 23	#1
Upper Arkansas River (Climax to Canon City) and Beaver Creek (Eagle County)	June 15-Aug. 9	#2
Colorado River (Dotsero to Debeque)	Aug. 12-Aug. 30	#2
Piceance Creek Basin	Sept. 2-Sept. 20	#1
Rio Grande River Basin	Sept. 9-Nov. 27	#2
McElmo Creek (Montezuma County)	Dec. 2-Dec. 17	#1
Bear Creek (Jefferson County)	Dec. 2-Feb. 22	#2
Animas and Upper San Juan (above Navajo Reservoir) river basins	Jan. 2-Apr. 30	#1
Boxelder Creek (Elbert and Arapahoe Counties)	Mar. 3-Mar. 21	#2
Lower Cache La Poudre (Fort Collins to South Platte River)	Apr. 15-June 13	#2
Lower San Juan River Basin (including Mancos and La Plata Rivers)	May 15-June 13	#1

COLORADO WATER QUALITY MONITORING NETWORK

The Division of Water Quality operates a system of 127 permanent water quality sampling stations. The system is divided into a primary and secondary network. The primary stations are sampled at a frequency of approximately four times per month while the secondary stations are sampled four to six times annually. The parameters to be analyzed are also divided into two groups according to their estimated importance and/or analytical relationship to the other parameters being run. Frequency of sampling, parameters sampled, and station locations are reviewed annually and may be changed as governed by the variability of the associated data.

Water Quality ParametersGROUP I

Temperature	Magnesium
pH	Sodium Adsorption Ratio (SAR)
Dissolved Oxygen	Total Hardness as CaCO ₃
Turbidity	Specific Conductivity
Total Solids	Nitrates
Suspended Solids	Nitrites
Dissolved Solids	Ammonia
5-day Biochemical Oxygen Demand	Total Phosphorus
Chlorides	Total Coliform Organisms
Sodium	Fecal Coliform Organisms
Calcium as CaCO ₃	

GROUP II

Arsenic	Copper
Boron	Cyanide
Cadmium	Fluorides
Chemical Oxygen Demand (COD)	Iron
Chromium, Hexavalent	Kjeldahl Nitrogen

Lead

Manganese

Methylene Blue Active Substances

Radium -226

Selenium

Silver

Sulfates

Total Alpha Radioactivity

Total Beta Radioactivity

Suspended Volatile Solids

Zinc

Primary Monitoring Network Stations

All samples collected from these stations are analyzed for the parameters from Group I. (Approximately 52 samples per station per year.) Analyses for the parameters of group II are conducted on these stations bi-monthly (6 samples per station per year). The stations are as follows:

<u>Station Number</u>	<u>Station Number</u>
1. Arkansas River near Coolidge, Kansas	28. Big Thompson near mouth
4. Arkansas River near La Junta, Colorado	31. St. Vrain below Longmont
5. Arkansas River near Nepesta	33. Boulder Creek at Boulder-Weld County Line.
16. Fountain Creek below Colorado Springs	34. Clear Creek near mouth
18. Rio Grande east of Manassa	35. Clear Creek above Golden
20. South Platte near Julesburg	36. Bear Creek at Jeff-Denver County
22. South Platte near Kersey	38. Yampa River at Milner
23. South Platte at Henderson	46. Colorado River near Dotsero
24. South Platte above Littleton	47. Colorado River at New Castle
27. Cache La Poudre near Greeley	52. Eagle River at Gypsum
	53. Roaring Fork at mouth
	54. Gunnison River southeast of Grand Junction.

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| 55. Uncompahgre River at Delta | 124. Little Thompson River near Milliken |
| 76. Eagle River at Avon Bridge | 126. Cache La Poudre near I-25 rest |
| 89. Clear Creek at Wheat Ridge | area southeast of Ft. Collins. |

Secondary Monitoring Network Stations

All samples collected from these stations are analyzed for the parameters of both Group I and Group II. Samples are collected from these stations four to six times annually.

<u>Station Number</u>	<u>Station Number</u>
2. Arkansas River at Lamar, Colorado	19. Rio Grande at Alamosa
3. Arkansas River at Las Animas, Colo.	21. South Platte at Balzac
6. Arkansas River near Pueblo	25. South Platte at South Platte
7. Arkansas River near Canon City	26. Cache La Poudre above fort Collins
8. Arkansas River near Salida	30. St. Vrain at Weld-Boulder County
9. Arkansas River below Leadville	Line.
10. Purgatoire River near Las Animas	32. Left Hand Creek near Niwot
11. Purgatoire River below Trinidad	37. North Platte below Cowdrey
12. Apishapa River near Fowler	39. Yampa River near Maybell
13. Huerfano River near Boone	40. Yampa River below Little Snake
14. Cucharas River below Walsenburg	River.
15. Fountain Creek at Pueblo	41. Little Snake above Lily
17. Fountain Creek near Manitou	42. Little Snake near Baggs, Wyoming
18. Rio Grande east of Manassa	42. White River at Meeker

44. White River at Rangely
45. Colorado River near Hot Sulphur Springs.
48. Colorado River near Cameo
49. Colorado River near Fruita
51. Colorado River at Utah State Line.
56. Gunnison River near Delta
57. Gunnison River west of Gunnison
58. Taylor River at Almont
59. Tomichi Creek at Gunnison
60. Dolores River in Utah
61. Dolores River at Gateway
62. McElmo Creek west of Cortez
63. San Juan River near State Line
64. Mancos River 3 miles north State Line.
65. La Plata River north of La Plata
66. Animas River near Bondad
67. Los Pinos River near Laboca
68. San Juan River above Navajo Reservoir.
69. Piedra River NE of Arboles
70. Republican River below Bonny Reservoir.
71. Arickaree River near Haigler, Nebraska.
72. Black Wolf Creek above mouth
73. Republican River near Laird
74. Gore Creek above mouth
75. Gore Creek at Bighorn Subdivision
77. Ten Mile Creek at Kokomo
78. East River at confluence with Taylor
79. Uncompahgre River at Ridgway
80. Dolores River near Dolores
81. Animas River above Durango
82. Animas River near Silverton
83. Eagle River near Pando
84. San Miguel at confluence with Dolores
85. Dolores River above confluence with San Miguel.
86. St. Charles River east of Blende
87. Rock Creek near McCoy
88. Yampa River above Oak Creek confluence.
90. Arkansas River at Catlin canal Headgate
91. Purgatoire River near Segundo
92. Apishapa River at Hwy. 85-87 near Aguilar.
93. Cucharas River at Walsenburg public water supply diversion.
94. Huerfano River at intersection with Hwy. 85-87.

95. St. Charles River above confluence with North St. Charles River.
96. Adobe Creek above confluence with Arkansas River.
97. Beaver Creek above confluence with Arkansas River
98. Blue River below Dillon Reservoir
99. Blue River at confluence with Colorado River.
100. North Fork of the Gunnison River below Hotchkiss.
101. San Miguel River at Hwy. 145 near Norwood.
102. Navajo River near Chromo
103. Mancos River at Hwy. 160
104. La Plata River at U.S. Hwy. 160
105. Florida River at U.S. Hwy. 160
106. Florida River near confluence with Animas River.
107. Saguache Creek near town of Saguache
108. Willow Creek above Town of Creede water supply diversion.
109. Goose Creek above confluence with Rio Grande River.
110. South Fork of Rio Grande near confluence with Rio Grande at South Fork.
111. Pinos Creek near Del Norte.
112. Conejos River near Magote.
113. Green River at Colo-Utah State Line.
114. Big Thompson River near Loveland.
115. Blue River above Dillon Reservoir.
116. Surface Creek below Eckert.
117. White River below confluence of Piceance Creek.
118. Cross Creek at confluence with Eagle River.
119. San Juan River below Pagosa Springs.
120. Michigan River at U.S. Hwy. 125 near Walden.
121. Laramie River at Colo-Wyo. state Line.
122. Bear Creek above Morrison.
123. Little Thompson River near Berthoud.
125. Big Thompson River below Estes Park.
127. South Platte below Fort Morgan (at Iliff).
128. South Platte River below Sterling.