

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

River or Stream Survey \_\_\_\_\_ Initial Survey X  
 Date(s) of Field Work August 15 to September 23, 1994 Resurvey \_\_\_\_\_  
 Leader Al Schmidt  
 Assistant(s) A. Stevens  
                   S. Eisenmenger

NAME, LOCATION, AND FLOW CHARACTERISTICS

1. Stream Name Goose Creek
2. Alternate Name(s) Unnamed
3. Tributary Number M-34-90
4. Counties Olmsted
5. Watershed Name and Number Zumbro River - 35
6. Sequence of Waterways to Basin to the South Fork Zumbro River, to the Main Zumbro River, to the Mississippi River
7. Map(s) Used Salem Corners - 1974
8. Length of Stream 4.4 miles (to Suess WMA)
9. Average Width-Upper Station 8.6 ft. Lower Station 17.2 ft.
10. Mouth Location T. 105N R. 15W S. 1 (SW 1/4)
11. Flow at Mouth 3.8 cfs. Date 8-16-94
12. Flow at Gaging Station-Minimum -- cfs Average -- cfs
13. Location of Gaging Station There is no gaging station.
14. Initial Source of Sustained Flow Initial source of sustained flow can be found at Tributary numbers 6 and 7 located in sections 16 and 22 of Rock Dell Township.
15. Gradient 25 ft/mi
16. Sinuosity 1.4

WATERSHED DESCRIPTION AND USE

17. Description of Watershed (soil types, cover types, topography, land use age and ownership).
  - a. Entire Watershed Most of the land in the South Zumbro Watershed is used for agriculture. Public lands in the river basin include the Keller WMA located on the South Fork Zumbro River and the Suess WMA located near the headwaters of Goose Creek. Much of the land near the margins of smaller watercourses is steep and in pasture or brush. Soils in this area are highly erodible.
  - b. Land adjacent to stream The stream's immediate watershed is mainly comprised of open prairie and retired croplands along the upper reaches, changing to forested areas near the mouth. The main feature to note is the natural state in which much of the land adjacent to the stream has been either left wild or retired from agricultural production.

GENERAL INFORMATION ON THE STREAM

18. Reason for Survey Warmwater stream inventory

19. Previous Investigations and Surveys Surber completed a brief reconnaissance of Goose Creek along with his survey of the Zumbro River system - 1924 (Lake City Warmwater Files).

20. Special Problems or Conditions Based on survey work completed during summer 1994, the stream appeared to contain habitat suitable for brown trout. Upon winter inspection, however, (Feb. 95) the stream was completely frozen over. Water Temperatures do not appear suitable for trout.

21. Sources of Pollution Point sources of pollution were not found. Slight to moderate non-point source pollution resulting from agricultural runoff probably occurs from mile 2.0 to the source (T7 also).

22. Erosion

| Type        | Degree           | Affected Reach |
|-------------|------------------|----------------|
| Stream bank | Slight to severe | Miles 0.0-2.0  |

23. Stream Alterations (dredging, channeling) - location and date The main stem of Goose Creek passes through four culverts from its source to the mouth.

24. Dams and other obstructions (including beaver dams)

| Type   | Mi. from Mouth | Head (ft) | Length of Dam | Type of Control Structure | Use | Fish Barrier | Owner | Status |
|--------|----------------|-----------|---------------|---------------------------|-----|--------------|-------|--------|
| Beaver | 2.7            | 1         | 20 ft         | N/A                       | N/A | No           | N/A   | Fair   |

25. Use of Water: Fishing Recreation Com.Nav. Power Irrigation Livestock Watering X Other (specify) Livestock has access to a small portion of T4 (West Br.)

26. Access (location and ownership) Public access at Sues and Keller WMAs and at various road crossings.

27. Shoreline Developments A resident located in the NE 1/4 of S.11 has a mowed lawn close to the streambank.

28. Recreational Boating - a) Navigable reach None.  
 b) Type of Boating \_\_\_\_\_

29. Tributaries/Springs

Names-Trib #

|                          | M-34-90-1                                    | M-34-90-2 | M-34-90-3 | M-34-90-4      |
|--------------------------|----------------------------------------------|-----------|-----------|----------------|
| Water Source             | runoff                                       | runoff    | spring    | Type 2 wetland |
| Bank(R or L)             | L                                            | L         | L         | L              |
| Length(mi)               | .30                                          | .50       | .60       | 2.70           |
| Width(mouth)             | no data                                      | no data   | no data   | 6.00           |
| Miles from Mouth         | .70                                          | 1.90      | 2.20      | 2.90           |
| Flow(cfs)                | no data                                      | no data   | no data   | .60            |
| Stage(high, normal, low) | ----                                         | ----      | ----      | normal         |
| Temperature              |                                              |           |           |                |
| Mouth-Air                | 75                                           | 75        | 75        | 73             |
| Mouth-Water              | no data                                      | no data   | no data   | 64             |
| Source-Air               | no data                                      | no data   | no data   | 73             |
| Source-Water             | no data                                      | no data   | no data   | 55             |
| Time                     | 1030                                         | 1042      | 1105      | 0900           |
| Date                     | 8-16-94                                      | 8-16-94   | 8-16-94   | 8-15-94        |
| Remarks                  | Length of tributaries includes all branches. |           |           |                |
|                          |                                              |           |           |                |
|                          |                                              |           |           |                |
|                          |                                              |           |           |                |
|                          |                                              |           |           |                |
|                          |                                              |           |           |                |

29. Tributaries/Springs

Names-Trib #

|                          | M-34-90-5 | M-34-90-6 | M-34-90-7 |
|--------------------------|-----------|-----------|-----------|
| Water Source             | tile      | fen       | tile      |
| Bank(R or L)             | R         | R         | L         |
| Length(mi)               | 2.00      | 1.30      | 3.80      |
| Width(mouth)             | 3.50      | 4.00      | 4.00      |
| Miles from Mouth         | 2.95      | 3.45      | 3.45      |
| Flow(cfs)                | *         | 2.40      | 2.60      |
| Stage(high, normal, low) | high      | high      | high      |
| Temperature              |           |           |           |
| Mouth-Air                | 73        | 73        | 73        |
| Mouth-Water              | 56        | 63        | 64        |
| Source-Air               | 73        | 73        | 73        |
| Source-Water             | --        | 58        | 58        |
| Time                     | 0915      | 0925      | 0930      |
| Date                     | 8-15-94   | 8-15-94   | 8-15-94   |

Remarks \*The North and South Branch of T5 are tiled. A significant amount of water was flowing from their discharge point (mouth) during August 1994 and February 1995. Tribs. 1-3 were not sighted during the reconnaissance.

| 30. Stream Physical Characteristics            |             |             |
|------------------------------------------------|-------------|-------------|
| a. Station no.                                 | 1           | 2           |
| b. Date                                        | 9-23-94     | 9-23-94     |
| c. Loc. (mi.-mouth)                            | 0.1         | 2.9         |
| d. Length of station(ft)                       | 1054 ft.    | 1004 ft.    |
| e. % of station in:                            |             |             |
| Pools                                          | 46          | 26          |
| Riffles, rapids                                | 19          | 13          |
| Runs                                           | 35          | 61          |
| Other(list)                                    |             |             |
| f. Ave. width(ft)                              | 17.2        | 8.6         |
| g. Ave. depth(ft)                              | 1.1         | 1.7         |
| h. Flow(cfs)                                   | 3.8         | 4.5         |
| i. High water mark                             | 7 ft.       | 2-3 ft.     |
| j. Present stream stage<br>(high, normal, low) | normal/high | normal/high |
| k. Banks:                                      |             |             |
| Ave. height(ft)                                | 4.4 ft.     | 2.5 ft.     |
| Height range(ft)                               | 1-10 ft.    | 2-3 ft.     |
| Erosion (degree)                               | light-mod.  | none        |
| % grazed                                       | 0           | 0           |
| % ditched                                      | 0           | 0           |
| l. Shade*                                      | heavy       | moderate    |
| m. Pools**                                     |             |             |
| Ave. width(ft)                                 | 20.4 ft.    | 14.5 ft.    |
| Width range(ft)                                | 8-36 ft.    | 10-25 ft.   |
| Ave depth(ft)                                  | 2.3 ft.     | 2.5 ft.     |
| Maximum depth(ft)                              | 4.0 ft.     | 3.5 ft.     |
| Type -No. each                                 |             |             |
| A                                              | 3           |             |
| B                                              | 2           | 4           |
| C                                              |             |             |
| D                                              |             |             |
| Bottom type %~                                 |             |             |
| sand                                           | 32          | 20          |
| gravel                                         | 44          | 31          |
| rubble/boulder                                 | 3/0         | 21/24       |
| silt/clay                                      | 16/0        | 4/<1        |
| detritus                                       | 5           |             |
| n. Riffles and Rapids                          |             |             |
| Ave width(ft)                                  | 15.4 ft.    | 4.9 ft.     |
| Width range(ft)                                | 10-20 ft.   | 4-6 ft.     |
| Ave. depth(ft)                                 | .8 ft.      | 1.0 ft.     |
| Max. depth(ft)                                 | 1.7 ft.     | 1.5 ft.     |
| Max. velocity rge(fps)                         | No data     | No data     |
| Bottom type-%                                  |             |             |
| sand                                           | 8           |             |
| gravel                                         | 75          | 7           |
| rubble                                         | 17          | 73          |
| boulder                                        |             | 20          |

30. Stream Physical Characteristics (cont'd)

o. Runs:

|                     |          |          |
|---------------------|----------|----------|
| Ave. width(ft)      | 16.5 ft. | 6.6 ft.  |
| Width rge.(ft)      | 8-25 ft. | 5-12 ft. |
| Ave. depth(ft)      | 1.3 ft.  | 1.5 ft.  |
| Max. depth(ft)      | 2.8 ft.  | 2.7 ft.  |
| Max. vel. rge.(fps) | No data  | No data  |
| Bottom type-%       |          |          |
| rubble/boulder      | 3/0      | 49/13    |
| gravel              | 54       | 33       |
| sand                | 42       | 3        |
| silt                | <1       | 1        |
| detritus/clay       | <1/0     | 0/1      |
| Other (describe)    |          |          |
| Ave width           |          |          |
| Width rge.          |          |          |
| Ave. depth          |          |          |
| Max. depth          |          |          |
| Max. vel. rge.(fps) |          |          |
| Bottom type         |          |          |
|                     |          |          |
|                     |          |          |
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Data Pertaining to Similar Reach

|                                   | I       | II      |
|-----------------------------------|---------|---------|
| q. Location(mi. to mi.)           | 0.0-2.0 | 2.0-4.4 |
| r. Gradient (ft/mi)               | 30      | 25      |
| s. Sinuosity                      | 1.6     | 1.1     |
| t. Channel changes (slight>enten) | slight  | slight  |

Remarks Broken slabs of limestone dominate the substrate from the Co. 15 bridge to the upstream boundary of similar reach I.

\*Shade:

light        0-25%  
 moderate 25-75%  
 heavy       75-100%

\*\*Pool types:

Type A - Good cover, 3 ft or deeper  
 B - Good cover, less than 3 feet  
 C - Poor cover, 3 ft or deeper  
 D - Poor cover, less than 3 feet

~Bottom types:

Ledge rock -Large mass of solid rock  
 Boulder -over 10" in diameter  
 Rubble -3" to 10" in diameter  
 Gravel -1/8" to 3" in diameter  
 Sand -less than 1/8" in diameter  
 Silt -fine material with little grittiness  
 Clay -compact, sticky material  
 Muck -decomposed organic material, usually black  
 Detritus -organic material composed of sticks, leaves, decaying plants  
 Marl -calcereous material

31. Characteristics of Water

|                      |         |                      |
|----------------------|---------|----------------------|
| a. Station no.       | 1       | 2                    |
| b. Date              | 9-23-94 | 9-23-94              |
| c. Loc.(mi. mouth)   | .1      | 2.9                  |
| d. Length of station | 1054 ft | 1004 ft              |
| e. Time              | 1130    | 1315                 |
| f. Air temp.         |         |                      |
| g. Water temp.       | 67      | 58 - below tile line |
| h. Color             | clear   | clear                |
| i. Cause of color    |         |                      |
| j. Secchi disk       |         |                      |

Field Determinations:

Diss. O-2(ppm)  
 Free CO-2(ppm)

Field Determination or  
 Lab Analysis(F or L) \*\*

Total alkalinity(ppm)  
 Conductivity(micromohs/cm)  
 pH

Laboratory Analysis

Total nitrogen(ppm)  
 NH3 (ppm)  
 NO-2 (ppm)  
 NO-3(ppm)  
 Total Phos(ppm)  
 Orthophosphates(ppm)  
 Sulphate ion(ppm)  
 Chloride ion(ppm)  
 B.O.D. (ppm)  
 or C.O.D. (ppm)  
 Turbidity(JTU)  
 Tot. diss. solids(ppm)

Remarks \*\*No water samples were taken. This survey was completed in addition to what had been planned in 1994 work units.

32. Temperature Profile

| Date    | Location<br>(mi. from mouth) | Water<br>Temp. | Air<br>Temp | Water<br>Stage | Time | Cloud<br>Cover |
|---------|------------------------------|----------------|-------------|----------------|------|----------------|
| 8-16-94 | mouth                        | 62°            | 75°         | normal         | 1030 | clear          |
| 8-16-94 | .10                          | 62°            | 77°         | normal         | 1050 | clear          |
| 8-16-94 | Co. 15 Br.                   | 62°            | 78°         | normal         | 1149 | clear          |
| 8-16-94 | 1.8                          | 63°            | 80°         | normal         | 1300 | clear          |
| 8-19-94 | 2.8                          | 64°            | 70°         | norm/high      | 1000 | overcast       |
| 8-15-94 | 2.9                          | 58°            | 73°         | norm/high      | 1300 | clear          |
| 8-19-94 | 3.5                          | 65°            | 69°         | norm/high      | 1130 | overcast       |
| 8-15-94 | T.6 (4.0)                    | 58°            | 69°         | norm/high      | 1200 | overcast       |
| 8-15-94 | source (4.4)                 | 57°            | 69°         | norm/high      | 1220 | overcast       |

Remarks \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



33. Biological Characteristics \_\_\_\_\_

|                          |         |         |
|--------------------------|---------|---------|
| a. Station no.           | 1       | 2       |
| b. Date                  | 8-15-94 | 8-15-94 |
| c. Loc.(mi. from mouth)  | .1      | 2.9     |
| d. Length of station(ft) | 1054    | 1004    |

e. Aquatic plants or filamentous algae: \* SEE 33f.

| Species | Abundance | Abundance | Abundance | Abundance |
|---------|-----------|-----------|-----------|-----------|
|         |           |           |           |           |
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f. Description of aquatic plants Water crowfoot (Ranunculus sp.) was occasional to common from mile .5 to the source.

g. Common Invertebrates:  
 order or family(check blank if present)

|               |   |   |
|---------------|---|---|
| Ephemeroptera | O | C |
| Plecoptera    | C |   |
| Diptera       | P |   |
| Megaloptera   | P |   |
|               |   |   |
|               |   |   |
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Remarks \_\_\_\_\_

\*Plant or algae abundance:  
 A-Abundant C-Common O-Occasional R-Rare P-Present

34. Fishery Characteristics

|    |                        |            |    |            |    |    |    |
|----|------------------------|------------|----|------------|----|----|----|
| a. | Station no.            | 1          |    | 2          |    |    |    |
| b. | Date                   | 9-23-94    |    | 9-23-94    |    |    |    |
| c. | Loc.(mi. mouth)        | .1         |    | 2.9        |    |    |    |
| d. | Length of station(ft)  | 450 ft     |    | 800 ft     |    |    |    |
| e. | Gear                   | 1 backpack |    | 1 backpack |    |    |    |
| f. | Amt of sample effort   | 450 ft     |    | 800 ft     |    |    |    |
| g. | Species Present        | No         | Wt | No         | Wt | No | Wt |
|    | Stoneroller sp.        | Common     |    | Occasional |    |    |    |
|    | Southern redbelly dace |            |    | Present    |    |    |    |
|    | Fathead minnow         |            |    | Present    |    |    |    |
|    | Blacknose dace         |            |    | Common     |    |    |    |
|    | Creek chub             | Common     |    | Common     |    |    |    |
|    | White sucker           | Common     |    | Common     |    |    |    |
|    | Northern hogsucker     | Occasional |    |            |    |    |    |
|    | Green sunfish          | Present    |    | Present    |    |    |    |
|    | Fantail darter         |            |    | Occasional |    |    |    |
|    | Johnny darter          | Present    |    | Present    |    |    |    |

h. Gamefish young-of-year

| Species         | No | Wt | No | Wt | No | Wt |
|-----------------|----|----|----|----|----|----|
| Smallmouth bass | 1  | -- |    |    |    |    |
|                 |    |    |    |    |    |    |
|                 |    |    |    |    |    |    |
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Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Total SPECIES>>>> No adult gamefish were collected.

Length(Inches)

- 3.0-3.4
- 3.5-3.9
- 4.0-4.4
- 4.5-4.9
- 5.0-5.4
- 5.5-5.9
- 6.0-6.4
- 6.5-6.9
- 7.0-7.4
- 7.5-7.9
- 8.0-8.4
- 8.5-8.9
- 9.0-9.4
- 9.5-9.9
- 10.0-10.4
- 10.5-10.9
- 11.0-11.4
- 11.5-11.9
- 12.0-12.4
- 12.5-12.9
- 13.0-13.4
- 13.5-13.9
  
- 14.0-14.9
- 15.0-15.9
- 16.0-16.9
- 17.0-17.9
- 18.0-18.9
- 19.0-19.9
- 20.0-20.9
- 21.0-21.9
- 22.0-22.9
- 23.0-23.9
- 24.0-24.9
- 25.0-25.9
- 26.0-26.9
- 27.0-27.9
- 28.0-28.9
- 29.0-29.0
- 30.0-30.9
- 31.0-31.9
- 32.0-32.9
- 33.0-33.9
- 34.0-34.9

Totals \_\_\_\_\_

36. Age and Growth of Gamefish      **None collected.**

a. Age class distribution

| Species | Sample Size | Subsample Size | Num. of Fish in Age Group |    |     |    |   |    |     |     |
|---------|-------------|----------------|---------------------------|----|-----|----|---|----|-----|-----|
|         |             |                | I                         | II | III | IV | V | VI | VII | II+ |
|         |             |                |                           |    |     |    |   |    |     |     |
|         |             |                |                           |    |     |    |   |    |     |     |
|         |             |                |                           |    |     |    |   |    |     |     |
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|         |             |                |                           |    |     |    |   |    |     |     |
|         |             |                |                           |    |     |    |   |    |     |     |

b. Growth of gamefish

| Species | Calculated mean total length at last annulus |       |        |       |      |       |                |
|---------|----------------------------------------------|-------|--------|-------|------|-------|----------------|
|         | I(N)                                         | II(N) | III(N) | IV(N) | V(N) | VI(N) | VII(N) VII+(N) |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |
|         |                                              |       |        |       |      |       |                |

37. Escape Cover for Gamefish

| Similar Reach | Type* and Amount** of Cover |
|---------------|-----------------------------|
| I             | LJ-O, B-O, OV-S, UB-O, IV-S |
| II            | LJ-S, B-O, OV-F, UB-F, IV-O |
|               |                             |
|               |                             |
|               |                             |

\*Cover types

- LJ - log jam
- B - boulders
- OV - overhanging vegetation
- UB - undercut bank
- IV - instream vegetation

\*\*Amount of Cover

- S - scarce
- O - occasional
- F - frequent

38. Portion of Stream Suitable for Gamefish

| Species         | Suitable Reach(mi. to mi.) |
|-----------------|----------------------------|
| Smallmouth bass | 0.0-2.0 (spawning/nursery) |
|                 |                            |
|                 |                            |
|                 |                            |

39. History of Stream and Fishing Conditions

a. Comparisons with past investigations and surveys Surber (1924) included a reconnaissance of Goose Creek in a survey of the Zumbro River. He reported that the stream had very clear water, but that unstable streamflows and high turbidity associated with floods rendered the stream unsuitable for trout. Haugstad (1987) collected 50 smallmouth bass at the mouth of Goose Creek. Twenty-three of the 50 were >7 inches.

b. History of fishing conditions There is no history of fishing conditions on Goose Creek.

39. History of Stream and Fishing Conditions (continued)

c. Records of past management **None**

Fish stocking

| <u>Year</u> | <u>Species</u> | <u>Size</u> | <u>Number or Pounds</u> |
|-------------|----------------|-------------|-------------------------|
|             |                |             |                         |
|             |                |             |                         |
|             |                |             |                         |
|             |                |             |                         |
|             |                |             |                         |
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|             |                |             |                         |

Rough fish removal

| <u>Year</u> | <u>Species</u> | <u>Size</u> | <u>Number or Pounds</u> |
|-------------|----------------|-------------|-------------------------|
|             |                |             |                         |
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Special regulations

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Habitat improvement:

| <u>Year</u>      | <u>Type and</u> | <u>Location</u>       | <u>Cost</u> | <u>Present</u>   |
|------------------|-----------------|-----------------------|-------------|------------------|
| <u>Installed</u> | <u>Amount</u>   | <u>(mile to mile)</u> |             | <u>Condition</u> |
|                  |                 |                       |             |                  |
|                  |                 |                       |             |                  |
|                  |                 |                       |             |                  |
|                  |                 |                       |             |                  |
|                  |                 |                       |             |                  |

40. Discussion of Fishery

a. General characteristics Goose Creek is a small, warmwater feeder stream containing about ten species of non-gamefish, mostly minnows.

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40. Discussion of Fishery (Continued)  
b. Fish management problems Two to three tile lines in similar reach II may contribute to destabilized streamflows.

41. Ecological Classification of Waterway Class III - Warmwater Feeder

42. Summary The primary value of Goose Creek is flow contribution to the South Fork Zumbro River. Additionally, the stream contains diverse fish and benthic invertebrate habitat. The presence of stoneflies indicates excellent water quality. Additionally, smallmouth bass may utilize the lower two miles of Goose Creek for spawning and rearing.

43. Credits and Signatures  
a. Funding F-29-R-14

b. Field work by  
Name of crew leader A. Schmidt  
Name of aide(s) A. Stevens  
S. Eisenmenger  
D. Bushong

c. Completed report by  
Name A. Schmidt  
Title Fisheries Specialist

Approved by *Mark H. [Signature]* Date 5/10/97  
Regional Fisheries Manager

Typist's initials:

## REFERENCED INVESTIGATIONS

Haugstad, M.C. 1987. Resurvey of the South Fork Zumbro River. Lake City files, 55 pp.

Surber, E.W. 1924. The Zumbro River System. Minnesota Dept. of Conservation, Division of Game and Fish, Lake City files, 70 pp.



## STATION DESCRIPTIONS

### Station 1.

T105N, R15W, S1 (SW 1/4). Begins at approximate mile .1 beneath a steel bridge, and extends upstream 1054 feet to the upstream side of a deep pool containing a large fallen tree.

### Station 2.

T105N, R15W, S15 (NE 1/4). Begins at the road crossing on the east side of S15, and extends 1004 feet upstream, to a deep pool with a large over-hanging dogwood located on the RAB at the upstream side of the pool.

