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Dermestid Beetles  
Michigan State University  
Cooperative Extension Service  
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18 pages

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# Dermeestid Beetles

## Larder and Carpet Beetles

By James Liebherr

Department of Entomology

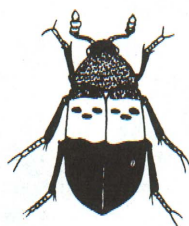
THE BEETLE FAMILY (Dermestidae) contains beetles collectively known as carpet beetles. These beetles feed on both animal matter, such as dried skins and hair, and plant matter, such as dried cereal grains. Therefore, you may find carpet beetles feeding on your stored woolens, or they may be feeding on stored food in your kitchen cupboards. This bulletin describes the four most common dermeestid beetles found in Michigan, and gives you recommendations for their control.

Dermeestid beetles can be divided into two basic types determined by the type of food they need for development. The first type of beetle requires animal products at least as part of its diet for successful completion of the life cycle. In our area, the most common representative of this group is the larder beetle.

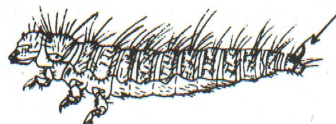
### The Larder Beetle

This beetle can easily be distinguished from all other carpet beetles. The adult is 7-9 millimeters

Larder Beetle



Adult (8 mm)



Larva (10 mm)

(mm) long (about 5/16 in), with an elongate or oval-shaped body. It is basically black; however, there is a wide olive brown band across the middle of the top surface. There are six black spots within this brown band.

The adult beetles can live for periods of up to a year. In unheated areas, they spend the winter in the adult stage. The adults mate and lay eggs after they have fed on protein-rich food. The eggs are laid directly on the food source. At room temperature in the home, the larvae will feed for about two months before they are ready to pupate. At that time they will leave the food and search for a sheltered place in which to transform into the pupal stage. Soon thereafter, the adult beetle emerges.

Occasionally only the larvae of this beetle may be found. The larvae of this species can be distinguished from the other common carpet beetles by the presence of two spines on the upper surface at the tip end of the abdomen. The larvae may grow to 8-10 mm long (about 3/8 in), and are generally a dark brown on the upper surface.

The larder beetles require animal matter to develop to maturity. In Michigan homes today, it is most often associated with dried dog food. This material is basically cereal, but contains enough meat and bone meal and animal fat to allow development of the larder beetle.

### Control

Because the larder beetle is found in the kitchen, a thorough search through your stored food is the first step in locating the source of infestation. Check for the beetles in dog food, home cured meat, hams, bacon and

cheese. Also, make certain that no animal carrion or dead insects are present, as these offer sources of food (rodents may be trapped in wall voids and create a source of infestation).

After the source of the problem has been found, clean the area thoroughly with a vacuum cleaner and soap and water. Remember, the larvae leave the food just before they pupate and may be hidden in cracks and crevices.

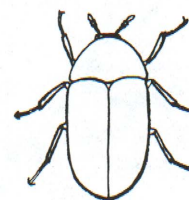
Finally, AFTER these steps have been taken, you may apply an insecticide. Use sprays of 1/2% Diazinon; or 2% Malathion; or 1/2% Baygon.

See page 4 for warnings concerning the use of these materials. These materials may also be applied by using an aerosol bomb.

### Black Carpet Beetle

The second basic type of carpet beetle can develop completely without the need for animal material in the diet. This type of beetle is most commonly found infesting stored woolens, wool rugs or rugs with plant fiber backings and furniture, as well as

Black Carpet Beetle



Adult (5 mm)



Larva (5 mm)



stored grains in the kitchen cupboard.

The adult black carpet beetle is about 5 mm long (3/16 inch) with an elongate oval body. It is dark brown to black, with a covering of short black hairs. In the spring, the adults are attracted to flowers where they feed on pollen, congregate, and mate. After mating, the female will search for a suitable place to lay her eggs. In nature, she may lay eggs in bird nests where the larvae may feed on feathers, but the insect becomes a pest if the adult enters the house and lays eggs there. The larvae are moderately hairy, about 5 mm long, with a long slender brush of hairs at the tip of the abdomen. They can develop in flour, cayenne pepper, and many types of seeds, and in stored materials containing wool, hair, bristles, silk and feathers.

The length of the life cycle in the black carpet beetle is variable. Depending on the amount of food available, and the temperature, it may take from six months to three years from egg stage to adult.

### Varied Carpet Beetle

The varied carpet beetle and the common carpet beetle are closely related, and they look similar in body shape. The adult varied carpet beetle is almost round when viewed from above, and about 3 mm long (1/8 in). Its upper surface is a shiny black; however, it takes on a mottled grey and black pattern because of the

presence of whitish scales on its upper surface.

The larvae of this species are more robust than either the larder beetle or black carpet beetle. They are about 7 mm long (3/16 in). In addition they have very thick patches of hairs on the sides of the abdomen near the posterior end.

The varied carpet beetle, like the black carpet beetle, congregates and mates on flowers in the spring. After mating, the female searches for a suitable place to lay her eggs. The larvae can be found in flour and spices, as well as in woolens, silk and other items of animal origin.

The length of the life cycle may vary quite a bit but usually it takes about one year to go from egg stage to adult.

### Common Carpet Beetle

The common carpet beetle looks very much like the varied carpet beetle. However, the adult can be distinguished easily by the bright brick red stripe down the center of the upper surface. This stripe is found along the inner margins of the wing covers. The larvae look very similar to the varied carpet beetle.

The adults emerge in spring and go to flowers and mate. The females then enter houses to lay their eggs. The larvae can be found in places similar to those in which the varied carpet beetle is found. The life cycle may be as short as 2½ months, or may take up to a year or more.

### Controls

Control of this second type of carpet beetle can start with preventive measures.

1. In the spring when the first shrubs are in bloom, you will find many adult beetles congregating and mating on the flowers. At this time, you should not leave windows open unless they are covered with tight fitting screens. If you keep the female carpet beetles from entering your house, you need not worry about larvae infesting your home. Remember, however, that these beetles are extremely small and they may enter the home through cracks in the siding, or eaves, or through attic vents.

2. Another preventive measure is to use PDB (paradichlorobenzene) moth crystals or moth balls in storage closets and trunks. In a closet used for seasonal storage of clothes, use one pound of PDB to 100 cubic feet of space (a closet 3 x 4 feet and 8 feet high contains about 100 cubic feet). Because PDB fumes are heavier than air, the crystals should be put in a shallow pan on a shelf, or hung from the clothes rod in a perforated container. The closet should have a tight-fitting door to keep the PDB concentration high. **Note:** do not use plastic hangers in closets where PDB is used, as the chemical may dissolve the plastic.

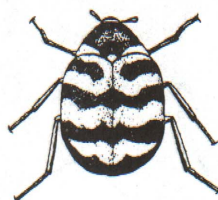
3. Cedar chests made of at least 70 percent ¾ inch heartwood of red cedar (*Juniperus virginiana*) that are used to protect clothes should be treated every few years with 100% cedar oil. The cedar oil may kill smaller larvae, but will not control the larger larvae and adults.

4. Dry clean clothes before putting them into storage to insure that no dermestids are entering on the clothes.

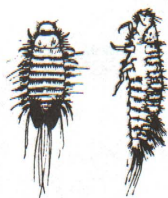
5. Finally, the best preventive measure is good housekeeping. Regular use of a vacuum cleaner will remove lint and pet hair, as well as eggs and larvae of carpet beetles. Seal all cracks along moldings and openings around pipes and heating vents to prevent beetles from moving from room to room within the house. Store food in tightly sealed containers, and keep cupboards clean of spilled grains.

6. If you see carpet beetle adults or larvae in your house even after you

Varied Carpet Beetle

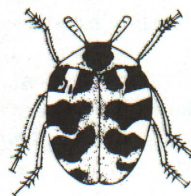


Adult (3 mm)

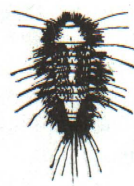


Larva (7 mm)

Common Carpet Beetle



Adult (3 mm)



Larva (7 mm)



have completed all preventive measures, the following treatments can be applied.

#### **In living rooms or bedrooms:**

— Apply an insecticide to the edges of rugs and under furniture. Pay particular attention to wall to wall carpeting along the molding as the larvae can do well in the shelter of an unwalked on portion of carpet. Use the vacuum cleaner on the center of the carpeting.

— For a spray, use either 5% malathion or 5% methoxychlor in water. Be sure to test the solution on a small area first as the water solution may cause slight staining.

— For a dust, a 10% methoxychlor dust may be used.

#### **In storage closets:**

If carpet beetles are noticed, have the clothes dry cleaned, and use PDB to fumigate the closet.

#### **In kitchen cupboards or other kitchen areas:**

Follow the same clean-up and control recommendations as for the larder beetle.

Remember to follow the label when using any insecticide. The label is a legal document describing the legal uses for the insecticide. Much research has been done before any uses are finally approved, and thus concentrations and types of application described on the label are the safest and most efficient available.

### **Using Insecticides**

For good insect control, learn how to use insecticides (chemicals) effectively. Most are available in several formulations, each with its own use for control in and around houses.

Those discussed here are the more common formulations. For others, read the label on the container for instructions on use.

#### **Emulsifiable Concentrates**

Emulsifiable concentrates are liquids. They must be mixed with water, turning it milky (the emulsion). Apply them outdoors both to plants and around foundations. Be careful when applying to tender flowers and shrubs, for they may injure these plants. In concentrated form, emulsifiable concentrates are dangerous if

spilled on clothing and skin. Change clothing and use masks and protective clothing while spraying, especially if applying dangerous materials over a long period of time.

#### **Solutions**

Solutions are also liquids. They differ from emulsions in that they are used as bought and **ARE NOT MIXED WITH WATER**. They are made with refined (deodorized) kerosene or similar materials, plus an insecticide. Use them indoors to control household insects. Do not apply to plants, for they will cause severe injury. Solutions are dangerous if spilled on clothing and skin. Immediately wash off with soap and water and change clothing. For other instructions, see **Emulsifiable Concentrates** above. Deodorized kerosene is difficult to obtain in small quantities today, so most liquid insecticides must be used as emulsifiable concentrates.

#### **Wettable Powders**

These are similar to dusts (see below), but they contain a higher percentage of chemical. However, wettable powders are usually mixed with water and applied as sprays. The spray is seldom used indoors, but is useful when applied outdoors. Avoid breathing or getting powder (or spray) on the skin. Use masks and protective clothing, especially if applying dangerous materials over a long period of time.

#### **Dusts**

Dusts are dry powders which normally contain a lower percentage of insecticide than wettable powders. They are used as bought and **ARE NOT MIXED WITH WATER**. Use them both indoors and outdoors as previously specified.

#### **Aerosols**

Aerosols are liquids held under pressure in a container. When released, usually by pressing a button, some form a gas, others a spray. "Gas-producing" types are used for control of flying insects (such as flies), and liquid types for those that crawl or run on floors (such as ants). Choose to fit your needs.

#### **Equipment**

The compressed air sprayer, the quart-sized sprayer, the aerosol and

the paint brush are probably the best kinds of equipment for the home owner to use against household insects.

Each type of equipment listed below has good features and disadvantages. Careful study of your insect control jobs will help you buy and use the best type effectively.

#### **Compressed Air Sprayer**

The water capacity of a compressed air sprayer is usually one to four gallons. Air is pumped into the tank, forcing the spray out when the nozzle is opened. It is ideal for outdoor application of wettable powders and emulsions. Its use indoors is limited if a lot of water is applied with the insecticide. Shake the sprayer when you use wettable powder.

#### **Aerosol**

Aerosols (canned liquid under pressure) are discussed above and can usually be bought to fit your need. Buy as either "gas-producing" for flying insects, or liquid types for crawling pests.

#### **Quart-sized Sprayer**

The quart-sized sprayer is also a compressed air type, but air must be pumped into it continuously while in use. It can be used satisfactorily with emulsions and solutions, but not wettable powders. Use it both indoors and outdoors for treating small areas. **Note:** Where high pressure is needed for good application, it has limited use.

#### **Paintbrush**

Use an inexpensive paintbrush to apply insecticide solutions to baseboards, screens, and similar areas inside buildings. A light film is usually sufficient.

### **Warnings**

1. Inside buildings, apply Baygon, Diazinon, and most malathion formulations to small areas only (such as baseboards). Do not apply to entire rooms or buildings. Rotenone and pyrethrum preparations are even safer, provided that they do not contain materials more poisonous than methoxychlor and piperonyl butoxide. Some malathion formulations also have an odor.

2. Avoid using any material sug-



gested in this folder around food or where children can get into it. Do not allow children on insecticide-treated grass until 3 days after application.

3. Avoid breathing sprays or dusts. A handkerchief fitted to the face will help prevent excessive inhalation of these materials. If there is a chance of breathing highly poisonous materials, use a mask. While some insecticides such as pyrethrum or rotenone may be harmful to persons with asthma, the chemicals are generally quite safe otherwise.

4. If emulsifiable concentrates or concentrated wettable powders are spilled on the skin, wash immediately with soap and water.

5. Do not use insecticides in oil (kerosene) around open flames (pilot lights), electrical wiring, or an asphalt floor covering. Avoid the use of insecticides which may stain or spot fabrics.

6. Outdoors, avoid heavy applications to tender flowers and shrubs, especially emulsions. Read labels to avoid using any material specified as damaging to certain plants.

7. Do not apply any insecticide listed in this folder to vegetables or fruits, or to garden soils unless the label or up-to-date Michigan State

University Cooperative Extension literature says you can safely do so.

8. Never puncture an aerosol can. This can cause injury.

9. Read the label for each insecticide used. Then, follow directions.

### SPECIAL WARNING

For indoors, apply only those insecticides manufactured especially for the purpose. Formulations suitable for treating livestock and plants of all kinds outdoors **ARE NOT GENERALLY** the best types for use in buildings (homes). For example: formulations for indoor application should contain only the purified grade of the chemical, not the commercial agricultural product. There is less objectionable odor to purified grades than to the agricultural grade. In addition to the kind of insecticide used in household preparations, the carrier (often an oil) should be specifically processed (refined) to reduce or eliminate objectionable odors.

**Another point to consider:** When a household pesticide is applied behind quarter-round or any other like situation, or where there may be excessive heat, odor from the chemicals may be

more noticeable and consequently more objectionable than the pest itself.

### Pesticide Storage and Container Disposal

Store all pesticide chemicals away from the reach of children—preferably locked up. A separate storage area, well marked with an appropriate sign is recommended.

Carefully dispose of empty containers. The label for each pesticide can be a source of directions for proper and safe disposal of pesticide chemicals. Your county agricultural agent also has literature concerning this problem. For still further information, get United States Department of Agriculture's publication, entitled *Safe Disposal of Empty Pesticides' Containers and Surplus Pesticides*.

**Do you read the package label for instructions on how to use insecticides safely? It is better to read this information today than to worry about mistakes tomorrow.**



# ENVIRONMENTAL SKILLS TEAM SCORE CARD

<b>Team Members:</b> (Names) 1. _____ 2. _____ 3. _____	<b>Team Representing:</b> _____ (School or County) TOTAL TEAM SCORE <span style="border: 1px solid black; display: inline-block; width: 40px; height: 20px; vertical-align: middle;"></span>
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## SITE OVERVIEW

### A. CHARACTER OF THE SITE:

(Check (X) one each item)

(18)

Location	_____	Urban Area	_____	Rural Area
Affect by Population Centers	_____	Yes	_____	No
Stability	_____	Stable	_____	Unstable
Complexity	_____	Simple	_____	Complex
Productivity	_____	Low	_____	High
Land Use Demands	_____	Heavy	_____	Light

### B. PRESENT LAND USE:

(5)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGRICULTURE	NATURAL RESOURCES	RECREATIONAL	RESIDENTIAL	INDUSTRIAL COMMERCIAL

### C. PRIMARY FUNCTION OF THE SITE:

(17)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PRODUCTIVE	PROTECTIVE	MULTIPLE-USE	MAN-MADE

Products (\_\_\_ items)

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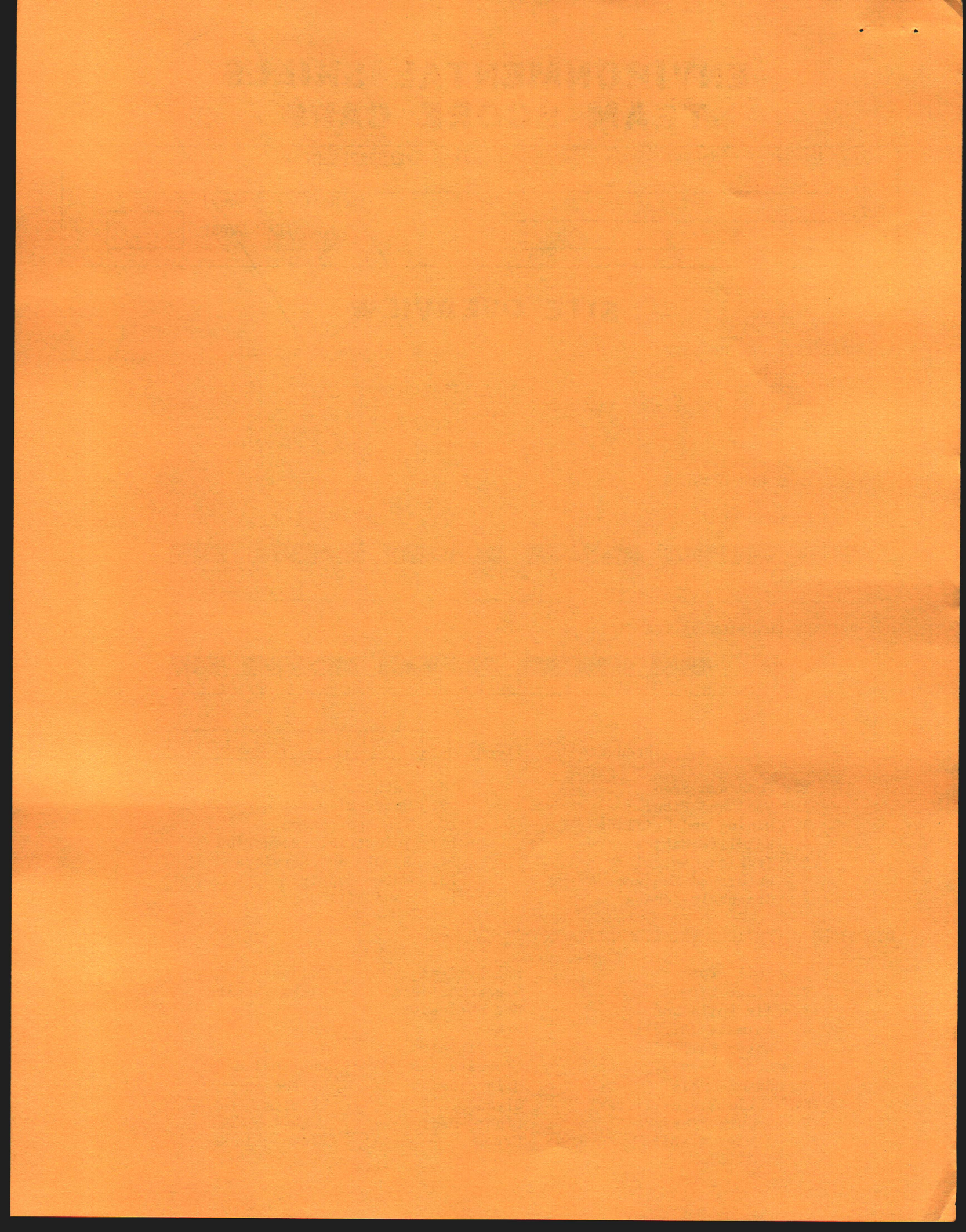
- |  |   |
|--|---|
| 1. Food and Feed<br>2. Wood and Fiber<br>3. Mining and Drilling<br>4. Wildlife Habitat<br>5. Erosion Control<br>6. Watershed Management<br>7. Greenbelt Zoning | 8. Esthetic Value<br>9. Waste Disposal<br>10. Transportation<br>11. Industrial Production<br>12. Supply and Services<br>13. Water Supply<br>14. Land Fill |
|--|---|

### D. SIGNS OF ENVIRONMENTAL QUALITY (EQ):

(20)

1. Soil Erosion	_____	Not Evident	_____	Evident
2. Plant Life	_____	Vigorous, dense	_____	Sickly, sparse
3. Air Pollution	_____	Not noticeable	_____	Noticeable
4. Animals (Birdlife)	_____	Present	_____	Absent
5. Water Pollution	_____	Not Visible	_____	Visible
6. Storm Sewers, Ditches	_____	Adequate	_____	Overloaded
7. Swamp Areas	_____	Maintained	_____	Filled in
8. Solid Waste--litter	_____	Clean	_____	Problem
9. People Pressure	_____	Light--medium	_____	Heavy--crowded
10. "Color of Site"	_____	Green	_____	Brown--black







# SITE COMPONENTS

## A. WATER Component of the Site

### 1. Type of Surface Water:

Standing Water

(or)

Running Water

(5)

☐ Lake

☐ River-Stream

☐ Pond

☐ Spring

☐ Swamp

☐ Drainage Ditch

☐ Bog

☐ Other \_\_\_\_\_

### 2. Temperature of Water: (Air Temp. is \_\_\_\_\_°F.)

(10)

a. At surface:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<50	50-60	60-70	70-80	80-90	>90°F. Temp.

b. At bottom, if deeper than 3 feet

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

### 3. Dissolved Oxygen (D.O.):

(10)

a. ppm at surface:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<2	2-4	5-7	8-10	>10 ppm

b. ppm at bottom, if deeper than 3 feet

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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### 4. Turbidity:

(5)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
< 25ppm very low	25-80 low	80-200 medium	200-400 high	>400 ppm very high

### 5. Chemical Nutrients in Water:

(10)

a. Nitrogen (nitrates) -

b. Phosphates -

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VERY LOW	LOW	MEDIUM	HIGH	VERY HIGH

Test \_\_\_\_\_ ppm

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LOW	MEDIUM	HIGH

Given \_\_\_\_\_ ppm

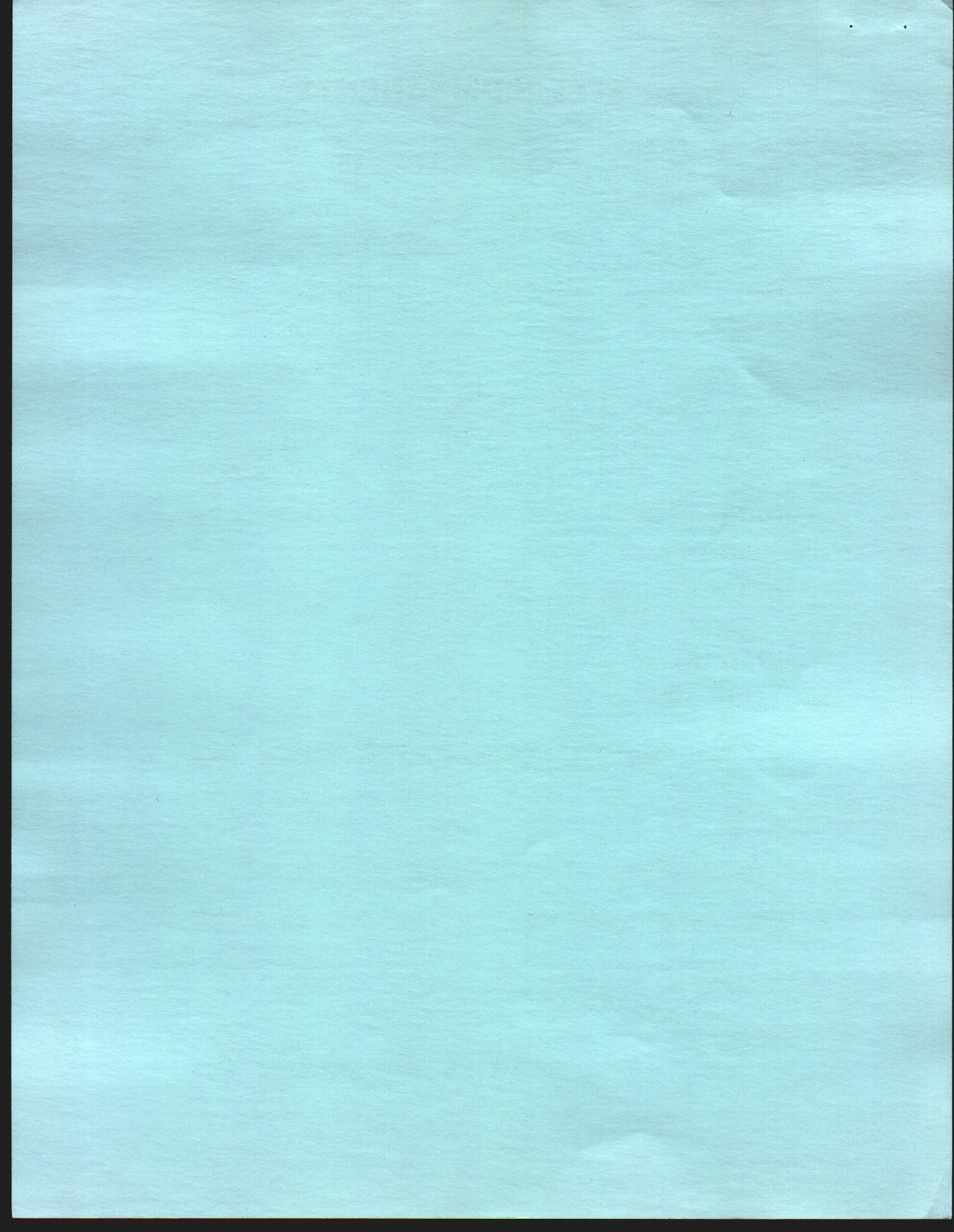
### 6. Biochemical Oxygen Demand (BOD):

(5)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very Clean	Clean	Fairly Clean	Doubtful	Bad

Given \_\_\_\_\_ ppm







# SITE COMPONENTS

## B. AIR Component of the Site

1. Visibility (time of day: \_\_\_\_\_)

(5)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CLEAR	HAZE	FOG	SMOG

2. Particulate Matter: (Check all three locations.)

(12)

	VERY LOW	LOW	MODERATE	HIGH	VERY HIGH
Location #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location #3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Particulate Size:

(12)

	A Visible as individual particles	B Visible as a group of particles	C Visible only when extremely dense; detect by odor
Location #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location #3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Particulate Type:

(12)

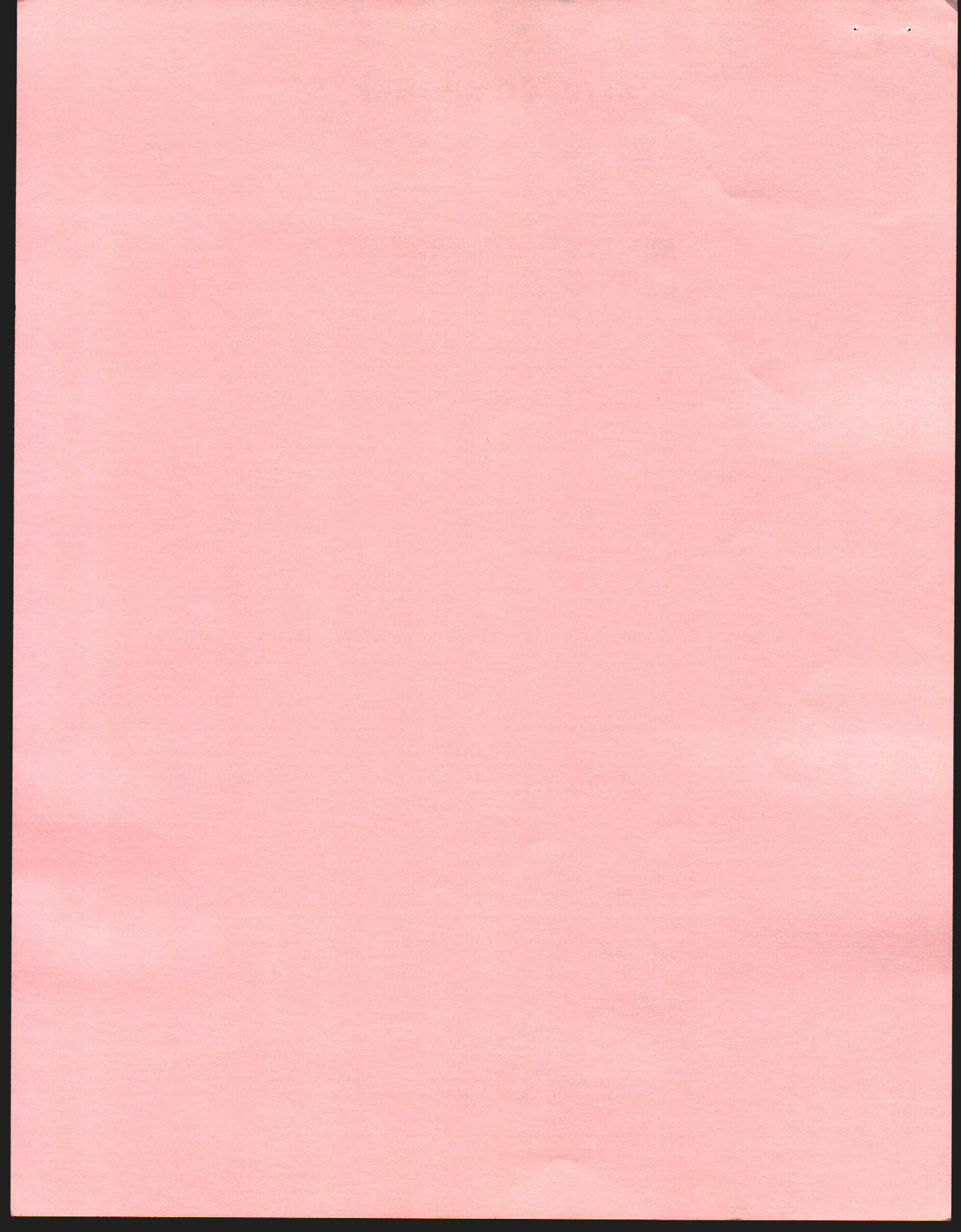
	SOIL	FLY ASH	POLLEN	OTHER
Location #1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location #2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location #3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Noticeable Effects of Air Pollution on Plants:

(4)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NONE	SLIGHT	MODERATE	SEVERE







# SITE COMPONENTS

## C. SOIL Component of the Site

### 1. Position:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Floodplain	Terrace	Upland

(5)

### 2. Slope:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0-2% Nearly Level	2-6% Gently Sloping	6-12% Moderately Sloping	12-18% Strongly Sloping	18% Steep

(5)

### 3. Texture:

TOPSOIL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fine	Medium	Mod. Coarse	Coarse	Organic
SUBSOIL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(10)

### 4. Color:

	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOPSOIL	Dark Brown to Black 5.0% O.M.	Brown 2.5-5.0% O.M.	Light Brown and Tan 2.5% O.M.
SUBSOIL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Dull	Mottled	Bright

(10)

### 5. Depth: to Water Table or Impervious Layer (i.e. marl or bedrock)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<10" Very Shallow	10-20" Shallow	20-40" Mod. Deep	40-72" Deep	> 72" Very Deep

(5)

### 6. Erosion:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SLIGHT	MODERATE	SEVERE	VERY SEVERE

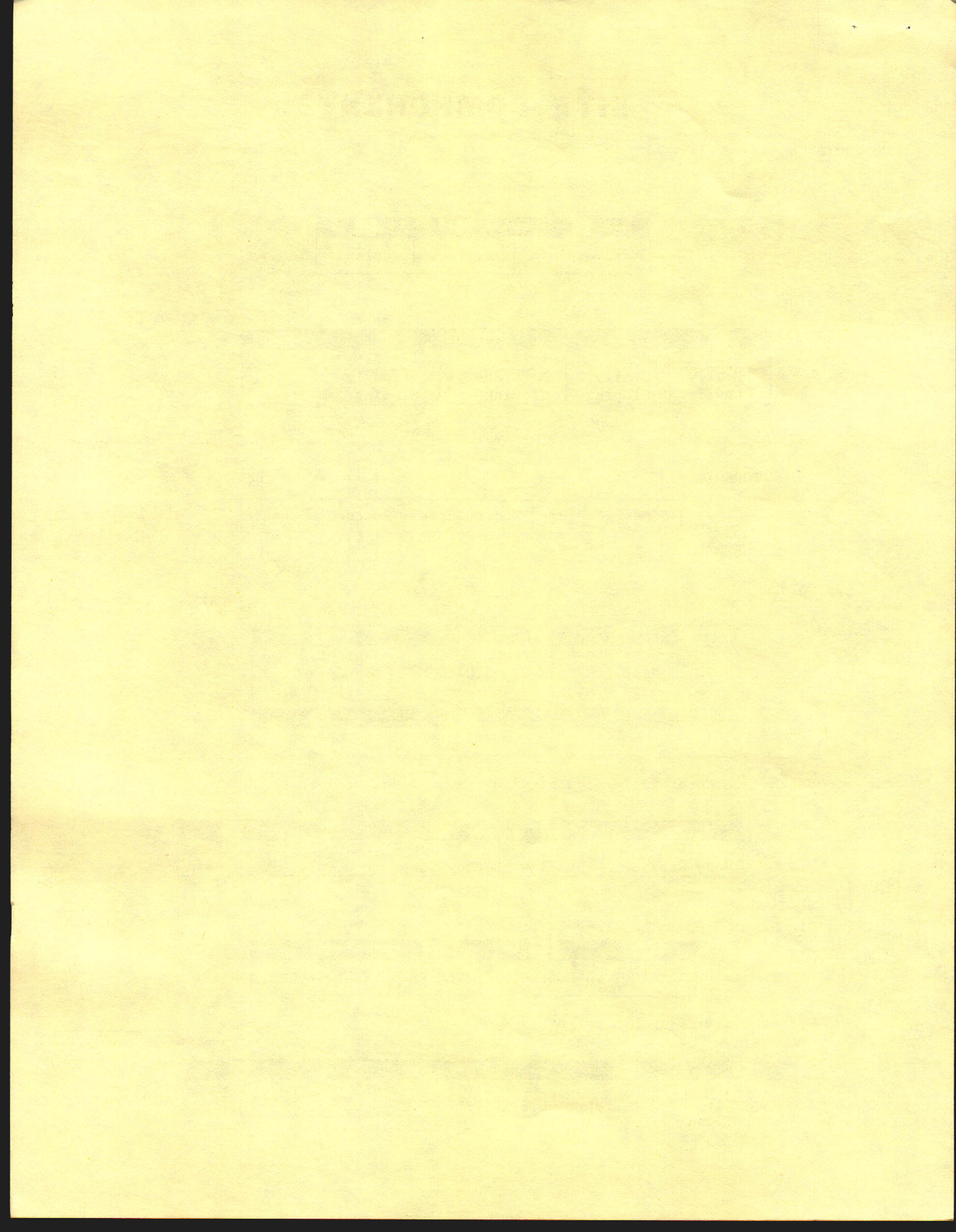
(5)

### 7. Permeability: (inches per hour)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Slow .05"/hr.	Slow .05-0.8"/hr.	Moderate 0.8-2.5"/hr.	Rapid 2.5-5.0"/hr.	V. Rapid 5.0"/Hr.

(5)







# SITE COMPONENTS

## D. BIOTA Component (Plants and Animals) of the Site

### Soil Organisms (15 points)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

### Aquatic Organisms (15 points)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

\_\_\_\_\_  
(15)

\_\_\_\_\_  
(15)

### Dominant Plants (15 points)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

### Dominant Animals (15 points)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

\_\_\_\_\_  
(15)

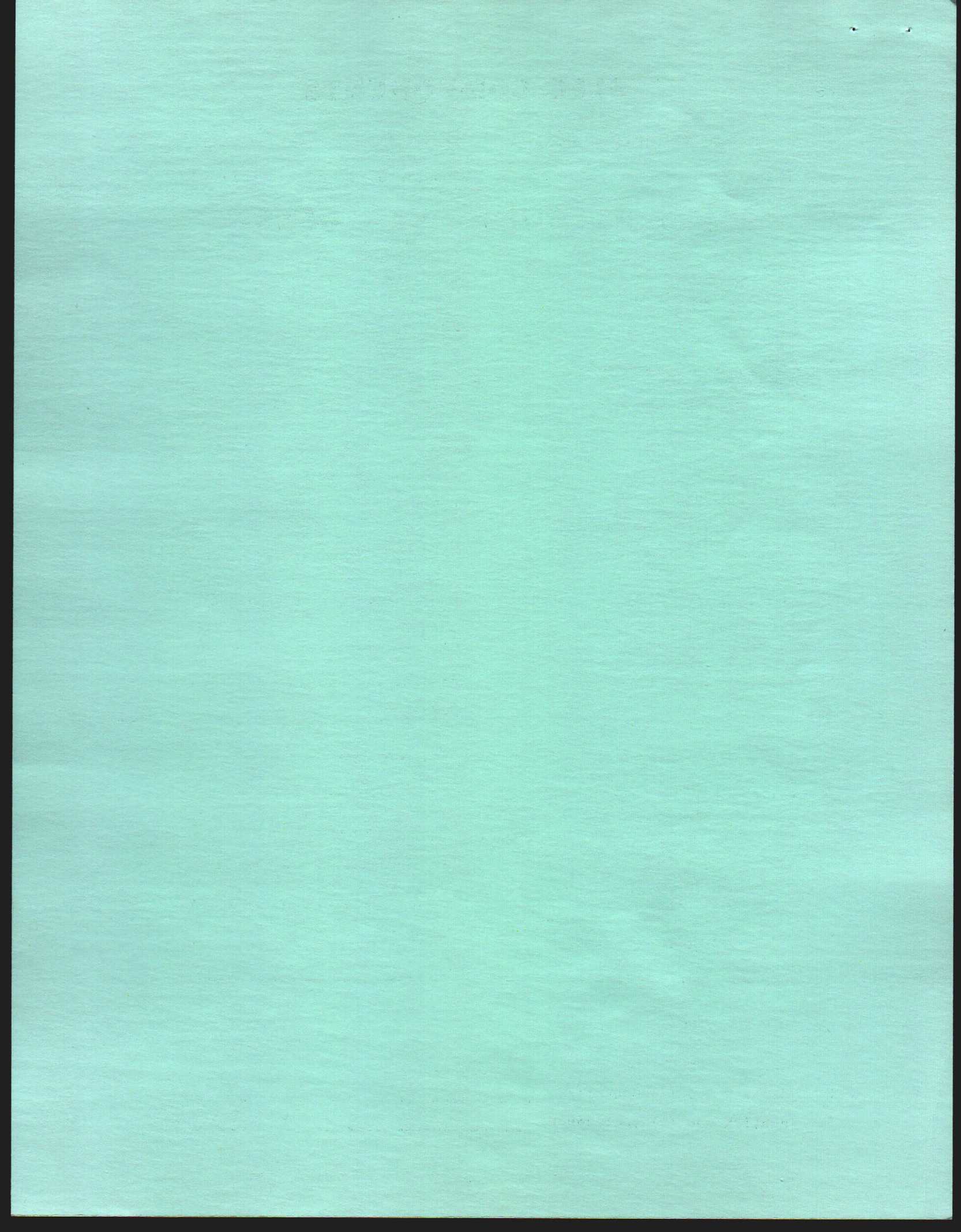
\_\_\_\_\_  
(15)

### Food Web (P-C-D Relationships)

1. Identify two (2) Producers: \_\_\_\_\_, \_\_\_\_\_
2. Identify two (2) Consumers: \_\_\_\_\_, \_\_\_\_\_
3. Identify one (1) Decomposer: \_\_\_\_\_

\_\_\_\_\_  
(5)







# SUITABILITY FOR USES

Determine the U.S.I. (Use Suitability Index) and L.F. (Limiting Factors) for the following five (5) Use Options (nos.) \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_. (12 pts. each)

## 1. AGRICULTURE - Cropland

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 2. AGRICULTURE - \_\_\_\_\_

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 3. NATURAL RESOURCES - Forestry & Wildlife

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 4. NATURAL RESOURCES - \_\_\_\_\_

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 5. RECREATIONAL - Fish Pond, Constr. & Management

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 6. RECREATIONAL - \_\_\_\_\_

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 7. RESIDENTIAL - Homes with septic tanks

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 8. RESIDENTIAL - \_\_\_\_\_

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

## 9. INDUSTRIAL/COMMERCIAL - Shopping Centers

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_

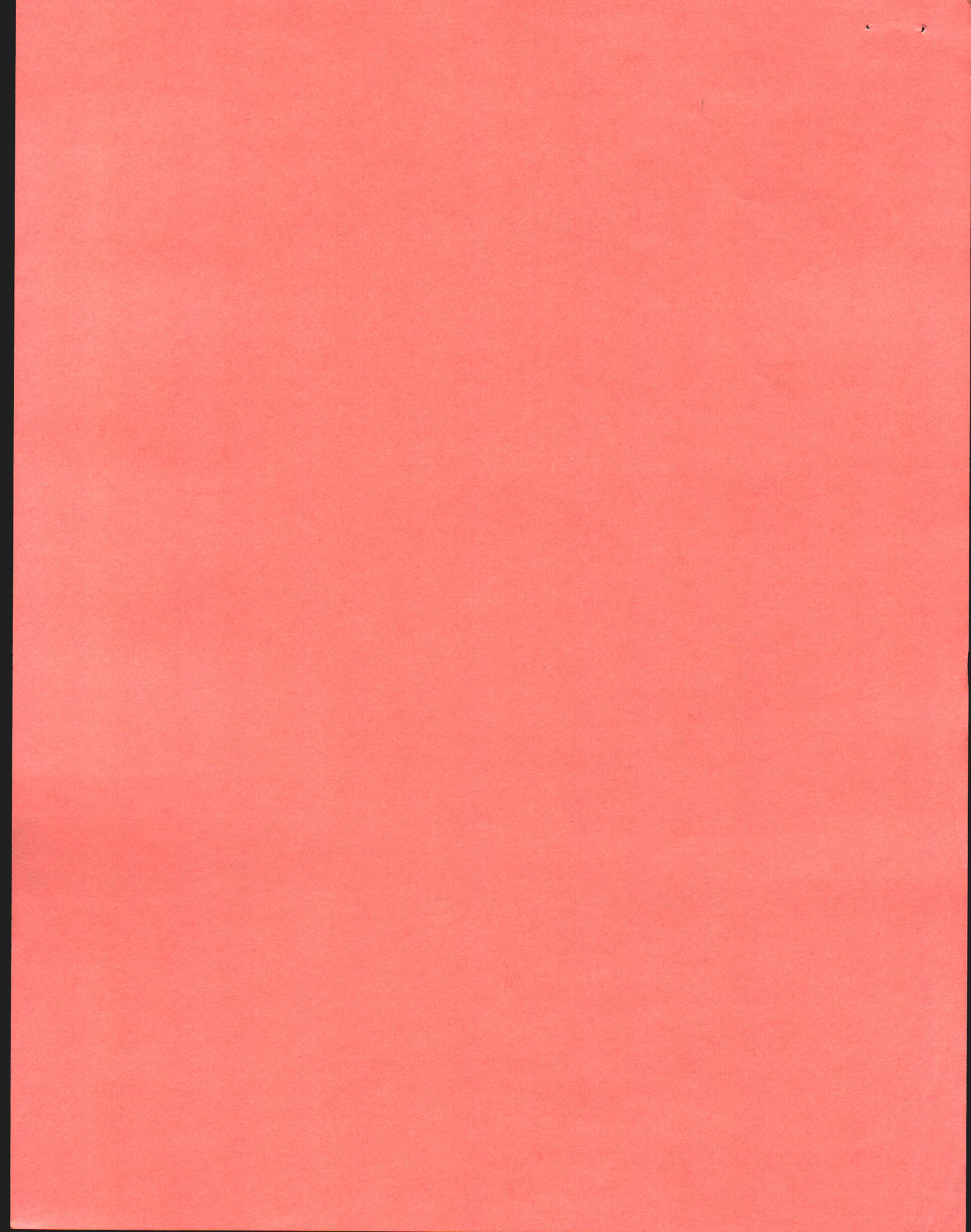
## 10. INDUSTRIAL/COMMERCIAL - \_\_\_\_\_

a) U.S.I. 

I	II	III	U
---	----	-----	---

b) L.F. \_\_\_\_\_, \_\_\_\_\_







## E. Q. EVALUATION

This site has been in this use for the past \_\_\_\_ years. Present trends are as follows:

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### A. BEST USE FOR THE SITE:

(20)

Select one best use after considering the above information.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AGRICULTURE	NATURAL RESOURCES	RECREATIONAL	RESIDENTIAL	INDUSTRIAL COMMERCIAL

### B. LIMITATIONS TO E.Q.

(30)

(Select \_\_\_\_ items)

--	--	--	--	--	--

- |                         |                     |
|-------------------------|---------------------|
| 1. Site Location        | 7. Flooding         |
| 2. Site Stability       | 8. Steep Slopes     |
| 3. Solid Waste--Litter  | 9. Soil Erosion     |
| 4. Water Quality        | 10. Permeability    |
| 5. Stream Sedimentation | 11. Animal Waste    |
| 6. Air Quality          | 12. Toxic Materials |

### C. SUGGESTED PRACTICES AND CORRECTIVE ACTIONS

(30)

Select \_\_\_\_ practices.

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1. Monitor for Pollution
2. Stabilize stream banks
3. Treat waste water
4. Replace septic tank with sewer system
5. Control weeds for pollen control
6. Install air pollution controls
7. Control erosion
8. Install windbreaks
9. Improve wildlife habitat
10. Install artificial soil drainage
11. Rezone as Greenbelt
12. Plant shrubs and trees for noise control, site barriers, etc.



# EVALUATION

1. The first part of the evaluation is the initial assessment of the situation. This involves gathering information about the problem and the resources available to solve it.

2. The second part is the development of a plan. This involves deciding on the best course of action to take, based on the information gathered in the first part.

3. The third part is the implementation of the plan. This involves putting the plan into action and monitoring progress.

4. The fourth part is the evaluation of the results. This involves comparing the actual results with the expected results and identifying any areas for improvement.

5. The fifth part is the final report. This involves summarizing the findings of the evaluation and providing recommendations for future action.

6. The sixth part is the conclusion. This involves summarizing the main points of the evaluation and providing a final assessment of the situation.

7. The seventh part is the appendix. This contains any additional information that may be useful in understanding the evaluation.

8. The eighth part is the bibliography. This lists the sources of information used in the evaluation.

9. The ninth part is the index. This provides a quick reference to the different sections of the evaluation.

10. The tenth part is the cover page. This is the first page of the evaluation and contains the title and author's name.

11. The eleventh part is the table of contents. This provides a list of the different sections of the evaluation and their page numbers.

12. The twelfth part is the executive summary. This is a brief overview of the entire evaluation.

13. The thirteenth part is the introduction. This provides an overview of the problem and the purpose of the evaluation.

14. The fourteenth part is the methodology. This describes the methods used in the evaluation.

15. The fifteenth part is the results. This presents the findings of the evaluation.