

SUPPLEMENT for Extension Bulletin E-763-S  
and 4-H Bulletin 330-B

**BASIC ECOLOGY AND MANAGEMENT**

**FIELD RECORD**

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**WORKBOOK**

**ECOSYSTEM**

**ANALYSIS**

MICHIGAN STATE UNIVERSITY

COOPERATIVE EXTENSION SERVICE • EAST LANSING

SUGGESTED USES OF THE SITE (SYSTEM) - REASON FOR ANALYSIS:

CONTINUED PRESENT USE \_\_\_\_\_

PROPOSED ALTERNATIVE #1 \_\_\_\_\_

PROPOSED ALTERNATIVE #2 \_\_\_\_\_

RECORD OF USE TRENDS: (Note - Taxes, Services, other activity and use in the area.)

- This site has been in the present use for the past \_\_\_\_ years.
- Population, Growth and Development trends in the area are as follows:

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HUMAN NEEDS: Check items that impact upon the site use.

- |   |  |
|---|--|
| <input type="checkbox"/> Energy Sources     | <input type="checkbox"/> Agriculture             |
| <input type="checkbox"/> Community Services | <input type="checkbox"/> Industry                |
| <input type="checkbox"/> Water Supply       | <input type="checkbox"/> Commerce                |
| <input type="checkbox"/> Sewage Disposal    | <input type="checkbox"/> Transportation Services |
| <input type="checkbox"/> Garbage Disposal   | <input type="checkbox"/> Zoning Ordinances       |

STATEMENT of current need that has stimulated the consideration of new and different uses for the site:

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Developed by Dr. Robert George, Extension Specialist, Environmental Conservation Education, Department of Fisheries and Wildlife, Michigan State University. Special thanks are due Dr. Martin Hetherington, Science and Math Teaching Center, and Dr. Arnold Mokma, Agriculture and Natural Resources Education Institute, for their advice and review of this Field Record Workbook. - October 1976

# ECOSYSTEM ANALYSIS

## SITE OVERVIEW

CHARACTER OF THE SITE:

Check (x) each item

- Location
- Population Pressures
- Complexity
- Productivity
- Land Use Demands

- Urban
- Yes
- Simple
- Low
- Heavy

-2	-1	(±)	+1	+2

- Rural
- No
- Complex
- High
- Light

PRESENT LAND USE:

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

PRIMARY FUNCTION OF THE SITE: Check (x) one

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

Check (x) Products of the Site:

- 1. Food and Feed
- 2. Wood and Fiber
- 3. Mining and Drilling
- 4. Wildlife Habitat
- 5. Erosion Control
- 6. Watershed Management
- 7. Greenbelt Zoning

- 8. Esthetic Value
- 9. Waste Disposal
- 10. Transportation
- 11. Industrial Production
- 12. Supply and Services
- 13. Water Supply
- 14. Land Fill

SIGNS OF ENVIRONMENTAL QUALITY (EQ) Check (x) each item

- 1. Soil Erosion
- 2. Plant Life
- 3. Air Pollution
- 4. Animals (Birdlife)
- 5. Water Pollution
- 6. Storm Sewers, Ditches
- 7. Swamp Areas
- 8. Solid Waste--litter
- 9. People Pressure
- 10. "Color of Site"

- Evident
- Sickly, sparse
- Noticeable
- Absent
- Visible
- Overloaded
- Filled in
- Problem
- Heavy--crowded
- Brown--black

-2	-1	(±)	+1	+2

- Not evident
- Vigorous, dense
- Not noticeable
- Present
- Not visible
- Adequate
- Maintained
- Clean
- Light--medium
- Green

# ECOSYSTEM ANALYSIS

The process of ecosystem analysis includes: first, an overview of the total site; second, evaluation of the various components--water, air, soil and biota (living matter); third, identifying the limiting factors to establish the use suitability indices of the site; and finally, an evaluation for the environmental quality. Given a situation with alternatives, decisions are then made as to the recommended use, the limitations, and suggested practices and/or corrective actions to maintain a quality environment.

## SITE OVERVIEW

Any site--large or small--is a system of interacting processes involving biotic and abiotic components. How the site (system) is adjusting to its physical, chemical and biological potential is of utmost importance.

The overview is a consideration of the site in its totality. It is important to identify the character of the site, the present use and function of the area, and signs of environmental quality.

### CHARACTER OF THE SITE

The sight character includes physical, biological, geographical and political (land value, tax evaluation, land use) features. It involves consideration of the area surrounding the site as well as the site itself.

### PRESENT LAND USE

Present land use is man's major use of the land today. It may be used primarily for agriculture, natural resources, recreation, residential, or industry and commerce.

Present land use is directly related to the function of the site and has an influence on the various components, limiting factors, and the best site use rating.

### PRIMARY FUNCTION OF THE SITE

The primary function is the "prime" or major activity of the site. This activity results in products which help identify the primary function as productive, protective, multiple-use or man-made.

### SIGNS OF ENVIRONMENTAL QUALITY (EQ)

The ten items listed can help in determining "overview signs" of EQ for the site. These visible characteristics are easily noticed and must be assessed to aid in the final evaluation.

## SITE COMPONENTS

Each site (ecosystem) has a number of basic component parts--water, air, soil and biota (plants and animals). An in-depth study of each component must be made to accurately assess the total site ecosystem. The results gathered in this section will be used in identifying the limiting factors, use suitability indices, and the suggested practices and/or corrective actions needed for maintaining environmental quality when the system is planned for a particular use such as Agriculture-Cropland, or Residential-Homes with septic tanks.

# SITE COMPONENT: WATER

## WATER Component of the Site

### 1. Type of Surface Water:

Standing Water

(or)

Running Water

Lake

River-Stream

Pond

Spring

Swamp

Drainage Ditch

Bog

Other \_\_\_\_\_

### 2. Temperature of Water: (Air Temp. is \_\_\_\_\_°F. at 4 feet above surface)

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"/>
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### 3. Dissolved Oxygen (D.O.):

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. Biochemical Oxygen Demand (BOD):

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

\_\_\_\_\_ ppm

### 5. Turbidity:

<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	>400ppm very high

### 6. Chemical Nutrients in Water:

a. Nitrogen (nitrates) -

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

\_\_\_\_\_ ppm

b. Phosphates -

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

\_\_\_\_\_ ppm

## SITE COMPONENT: WATER

Important considerations in the water component of the site are (1) type of surface water, (2) water temperature, (3) dissolved oxygen content, (4) biochemical oxygen demand, (5) turbidity of the water, (6) chemical nutrients--nitrogen and phosphorus.

### 1. TYPE OF SURFACE WATER

In deciding the type of surface water, first recognize whether it is standing water or flowing water. Each of these categories has a number of types.

### 2. TEMPERATURE OF WATER

The temperature of water has a great effect on the amount of life in the water. As temperature increases, the oxygen content decreases. However, as temperature increases, plant life is promoted, thereby requiring more oxygen to aid the decay of dead vegetation.

### 3. DISSOLVED OXYGEN

The Dissolved Oxygen (D.O.) content will affect the type and amount of life found in the water. The higher quality fish are found in waters with high D.O. levels. As the D.O. level decreases, many fish (other than rough fish) cannot survive. A high D.O. level is necessary in the early stages of their life cycle.

### 4. BIOCHEMICAL OXYGEN DEMAND

The Biochemical Oxygen Demand (B.O.D.) is the amount of oxygen needed to decompose dead and decaying organic matter and to meet the demand of living organisms. This measurement is compared with the dissolved oxygen (D.O.) test. If the B.O.D. test result is as great or nearly as great as the D.O., aquatic animals may not have enough oxygen to sustain life.

The test for B.O.D. takes five (5) days to complete. The results then are expressed in parts per million dissolved oxygen absorbed in five days. Very clean water has less than 1 ppm B.O.D., clean 1-2 ppm, fairly clean 3-4 ppm, doubtful 5-10 ppm and bad over 10 ppm.

### 5. TURBIDITY OF WATER

This is a measurement of the cloudiness of water caused by humus, silt, organic debris, and other products suspended in the water. Turbidity affects the amount of light that can enter into the lower levels of the water, thereby affecting the temperature and the dissolved oxygen level.

### 6. CHEMICAL NUTRIENTS IN WATER

Just recently, we have become concerned about the level of nutrients in our water. The major nutrients---nitrogen and phosphorous---combine to cause excess algae and aquatic weed growth when they are present in high amounts. This resultant growth dies during the winter and settles to the bottom where decomposition begins. The aerobic process of decomposition requires oxygen, thereby interfering with fish life.

# SITE COMPONENT: A I R

## AIR Component of the Site

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

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

2. Temperature (°F):

	Air (4 feet)	Air (1 foot)	Soil (Surface)	Soil (3 feet)
Location #1	_____	_____	_____	_____
Location #2	_____	_____	_____	_____
Location #3	_____	_____	_____	_____

3. Wind Direction (prevailing) is: \_\_\_\_\_  
(example: SW or WSW)

4. Wind Speed and Direction - As measured at:

Location #1 _____	Average: _____
Location #2 _____	_____ (Ex.: SW 10mph)
Location #3 _____	

5. Particulate Matter (Check (x) one for each location)

	Very Low	Low	Moderate	High	Very High
Location #1	_____	_____	_____	_____	_____
Location #2	_____	_____	_____	_____	_____
Location #3	_____	_____	_____	_____	_____

6. Particulate Size & Type (write in)

	<u>Size &amp; Type</u>	<u>Size Group</u>
Location #1	_____ & _____	>1.0 microns (μ) - A
Location #2	_____ & _____	0.1μ to 1.0μ - B
Location #3	_____ & _____	<0.1 micron (μ) - C
		<u>Type:</u> Soil, Pollen Flyash, other, etc.

## SITE COMPONENT: AIR

Clear air is as important as clean water. Although we cannot see clean air, we cannot live without it. The average person breathes 35 pounds of air each day, which is more than the food we eat and the water we drink combined.

### 1. VISIBILITY

Visibility is defined as the distance one can see. High visibility would allow us to see to the horizon. However, as stated above, this visibility may be limited by pollution. As we evaluate the environment we must know what is causing the reduced visibility.

### 2. TEMPERATURE

Temperature of the air and the soil and/or water over which it moves is critical to weather development and to movement of pollutants in the air.

### 3. WIND DIRECTION (PREVAILING)

### 4. WIND SPEED (TODAY) - Measured

### 5. PARTICULATE MATTER

Particulate matter may be solid or liquid droplets. These particles may settle out of the air to soil clothing and dirty window sills or may stay suspended to cause irritations to the respiratory system or do other damage. The density of particulate matter is very important in evaluating air quality.

### 6. PARTICULATE SIZE

Particulates are described by type and size. Particulate size is of special significance in determining air pollution. The unit used to describe particulate size is the micron. A micron is equal to 1/1,000 of a millimeter or 1/25,000 of an inch. We can see particles over 10 microns in diameter with the naked eye. Raindrops are 400 to 5,000 microns and fog droplets are 5 to 60 microns in size.

### 7. NOTICEABLE EFFECTS ON PLANTS

Many plants are extremely sensitive to air pollution. They are readily available for observation as they show effects more rapidly than animals. Many times shrubs are used to monitor air pollution and as an aid in reducing air pollution as well as for ornamental values.



# SITE COMPONENTS: S O I L

## SOIL Component of the Site

1. Position:

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

2. 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"/>

3. 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.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SUBSOIL	Dull	Mottled	Bright

4. Slope:

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

5. Erosion:

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

6. 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"	10-20"	20-40"	40-72"	72"
Very Shallow	Shallow	Mod. Deep	Deep	Very Deep

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.

8. Soil Acidity (Ph) \_\_\_\_\_

## SITE COMPONENT: SOIL

The soil is extremely important in overall environmental quality since it serves as the base for all life. It is the filter, storage and reduction center for organic materials - solids, liquids and gases - basic to sustaining life. It is the home for many micro-organisms, which are fundamental in decomposition and growth activities.

### 1. POSITION

The position of our site has great effects on its usage. A floodplain site does not lend itself well to subdividing because of the occurrence of seasonal floods but may lend itself very well to vegetable farming where the growing season is short and the need for irrigation is high.

### 2. TEXTURE

Soil texture has a very important effect on moisture holding capacity, permeability, fertility, and erosion. Texture refers to the percentage of sand, silt and clay. These three soil particles have distinct characteristics which allow us to determine the soil texture by rubbing a sample between our thumb and forefinger. Sand is gritty, silt is smooth and floury, and clay is sticky when moist.

### 3. COLOR

Soil color is a very noticeable characteristic. The true color is easier to determine when the soil is moist rather than when soil is dry. Color indicates the organic matter content in topsoil and the natural drainage effects in subsoil.

### 4. SLOPE

The slope or lay of the land is important because it affects the amount of erosion and water runoff. The steepness also affects the speed of water runoff and the ease of cultivation. As the steepness increases, the uses of the land become more limited. Slope is expressed in percent which represents the number of feet of rise or fall in a 100 foot distance.

### 5. EROSION

Erosion is the gradual process of losing soil. It is most evident when rills and gullies are formed. However, much soil is lost before this without detection. This latter type, known as sheet erosion, is more dangerous than the former type--gully erosion. Erosion occurs as a result of wind or water action on exposed soil.

### 6. DEPTH

When we consider the depth of a soil, we are concerned about the water table or impervious layers. The water table or the impervious layer (layer that water can't penetrate) can have a considerable effect on the use of the site. A shallow soil (high water table or impervious layer) may make the site unsuited for building, whereas a deep soil (low water table) may make the site ideal for many uses.

### 7. PERMEABILITY

Permeability is the rate at which water enters and moves through the soil. This is very important in its effect on drainage and run-off. Permeability is measured in inches per hour.

### 8. SOIL ACIDITY (Ph)

# SITE COMPONENT: B I O T A

BIOTA Component (Plants and Animals) of the Site

## SOIL ORGANISMS

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

## AQUATIC ORGANISMS

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

## DOMINANT PLANTS\*

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

## DOMINANT ANIMALS\*

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

FOOD WEB (P-C-D RELATIONSHIP) - Identify 3 of each:

P - Producers: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

C - Consumers: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

D - Decomposer: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

\*Dominant plants and animals are often Bio-Indicators of Environmental Quality.

## SITE COMPONENT: BIOTA

The biota component is the living portion of the site. This living portion involves plants and animals from trees and large animals to microscopic plants (fungi, etc.) and animals (protozoan, etc.). These living organisms may live below the surface as well as above, in water as well as soil, and may be producers or decomposers as well as consumers.

### 1. SOIL ORGANISMS

The soil is the home of innumerable kinds of plant and animal life ranging in size from those too small to be seen with a powerful microscope to large ones such as earthworms. Most of the soil organisms are so small you will not be able to see them without a microscope.

### 2. AQUATIC ORGANISMS

The aquatic organisms are all the plant and animal life in water (i.e. pond or stream). They include the fish--large and small--as well as the submerged plants and the microscopic organisms in the aquatic community. By various sampling methods (see appendix) we can identify the major aquatic organisms of the site.

### 3. DOMINANT PLANTS

The dominant plants that are present can tell us much about the natural succession of the site as well as the present use. These plants are classified as follows: Weeds, Grasses and Sedges, Shrubs, Trees under 30 feet and Trees over 30 feet.

### 4. DOMINANT ANIMALS

The dominant animals present also tell us much about natural succession. As we consider this factor we must not always expect to see the animals, but instead, should look for evidence of their presence (i.e. droppings, tracks, burrows and nests, etc.). Animals may be classified as follows: Mammals, Birds, Fishes, Amphibians and Reptiles.

### 5. FOOD WEB (P-C-D RELATIONSHIP)

When considering the food web we are concerned about the relationship of producer, consumer and decomposer organisms as they function to maintain the quality of environment. Producer organisms are those which use sunlight to produce food for the community (i.e. green plants). Consumer organisms are those that depend on the producers for their survival. Consumers may be herbivorous--feed on plants--or carnivorous--feed on other animals. Decomposer organisms feed on dead plants and animals to break them down into their constituent substances and release these substances (water, nitrogen, carbon dioxide, etc.) for use by the producers. The decomposers make the cycle complete so that each of the three groups depend on the others for their food.

# SUITABILITY FOR USES

Determine the U.S.I. (Use Suitability Index) and L.F. (Limiting Factors) for:

PRESENT USE \_\_\_\_\_

ALTERNATIVE #1 \_\_\_\_\_

	Exc	Good	Fair	Unsuitable
a) <u>U.S.I.</u>	I	II	III	U

	Exc	Good	Fair	Unsuitable
a) <u>U.S.I.</u>	I	II	III	U

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

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

ALTERNATIVE #2 \_\_\_\_\_

ALTERNATIVE #3 \_\_\_\_\_

	Exc	Good	Fair	Unsuitable
a) <u>U.S.I.</u>	I	II	III	U

	Exc	Good	Fair	Unsuitable
a) <u>U.S.I.</u>	I	II	III	U

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

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

## E. Q. EVALUATION

BEST USE FOR THE SITE:

Select one best use after considering the above information.

AGRICULTURE	NATURAL RESOURCES	RECREATIONAL	RESIDENTIAL	INDUSTRIAL COMMERCIAL

LIMITATIONS TO E.Q. FOR THE USE SELECTED:

Check (x) items that apply--write in as needed.

- |   |   |  |  |  |  |  |  |   |  |  |  |  |  |  |  |
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|   |   |  |  |  |  |  |  |   |  |  |  |  |  |  |  |
| <ol style="list-style-type: none"> <li>1. Site Location</li> <li>2. Site Stability</li> <li>3. Solid Waste--Litter</li> <li>4. Water Quality</li> <li>5. Stream Sedimentation</li> <li>6. Air Quality</li> <li>7. Flooding</li> </ol>   | <ol style="list-style-type: none"> <li>8. Steep Slopes</li> <li>9. Soil Erosion</li> <li>10. Permeability</li> <li>11. Animal Waste</li> <li>12. Toxic Materials</li> <li>13. _____</li> <li>14. _____</li> </ol> |  |  |  |  |  |  |   |  |  |  |  |  |  |  |

SUGGESTED PRACTICES AND CORRECTIVE ACTIONS

Check (x) practices needed.

- |   |  |  |  |   |  |  |  |
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| <ol style="list-style-type: none"> <li>1. Monitor for Pollution</li> <li>2. Stabilize stream banks</li> <li>3. Treat waste water</li> <li>4. Replace septic tank with sewer system</li> <li>5. Control weeds for pollen control</li> <li>6. Install air pollution controls</li> <li>7. Control erosion</li> </ol> | <ol style="list-style-type: none"> <li>8. Install windbreaks</li> <li>9. Improve wildlife habitat</li> <li>10. Install artificial soil drainage</li> <li>11. Rezone as Greenbelt</li> <li>12. Plant noise control/site barriers.</li> <li>13. _____</li> </ol> |  |  |   |  |  |  |

# SUITABILITY FOR USES

As consideration is given to the suitability of the site for various uses, a major indicator is found in the characteristics of the component parts--as tested and evaluated in SITE COMPONENTS. A review of the water, air and soil components' physical characteristics will help identify any "LIMITING FACTORS" and assist in determining the "USE SUITABILITY INDEX" of the site for each planned use. It also identifies those characteristics which make the site especially good for certain uses.

## USE SUITABILITY INDEX (U.S.I.)

The use suitability index is the degree of suitability of the site for a specific use--an indicator of the capability of the ecosystem to meet man's use needs; I - Excellent, II - Good, III - Fair, and U - Unsuitable.

## LIMITING FACTORS (L.F.)

The limiting factor (L.F.) is the characteristic or condition of the site that limits the suitability of the site for a proposed use. It is the factor which is the key to determining the USE SUITABILITY INDEX--the factor which determines the suitability of the site for a proposed use. The L.F. represents the weakest-link-in-the-chain of characteristics that must be considered for any specific proposed use. It also is important in determining the management practices needed to maintain E.Q. NOTE: More than one L.F. is usually involved in determining U.S.I.

## E.Q. EVALUATION

This part of ecosystem analysis is the most difficult but the most important if a quality environment is to be maintained. As we consider the ecological factors, we must also consider economic, social, and political factors such as land values, tax rates, zoning ordinances, population growth and others.

It is important to consider the "human needs" factors if we are to ably make decisions as to the "best" use of the site, the limitations to E.Q., and the corrective practices or actions to maintain or improve the environmental quality.

## BEST USE FOR THE SITE

To select the best use for the site consider the USE SUITABILITY INDEX and the "human needs" data.

## LIMITATIONS TO E.Q.

As the site is evaluated, several items can be identified as being limitations to a quality environment. These limitations should be considered in line with the BEST USE that is proposed for this site.

## SUGGESTED PRACTICES AND CORRECTIVE ACTIONS

Not only must limitations be identified but the necessary actions needed to maintain a quality environment must also be identified. We must be positive in analyzing an ecosystem in that these corrective actions will improve our environment. Several practices may be suggested as necessary corrective actions. The following list of practices is only a few possibilities. Let your imagination and technology identify other possibilities as they become available and practical. Select your practices from this list. Add items as appropriate.

Major Problem: \_\_\_\_\_  
Legal Description of site: \_\_\_\_\_

Twp. \_\_\_\_\_  
County \_\_\_\_\_  
Evaluation by \_\_\_\_\_  
Date \_\_\_\_\_

**MAP: (Drawing) Show proposed USE and EQ PRACTICES:**



A large empty rectangular box for drawing a map showing proposed use and EQ practices. A north arrow is located in the bottom right corner of the box.

**STATEMENT for Environmental Conservation Assessment:**

\_\_\_\_\_  
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**ECOSYSTEM ANALYSIS SUMMARY:**

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BASIC ECOLOGY AND MANAGEMENT —  
Field Record • Workbook

# ECOSYSTEM ANALYSIS

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