4. IDENTIFICATION AND QUANTIFICATION OF IMPACTS

4.1. Introduction

Environmental Impacts may be defined as any alteration of environmental conditions or creation of a new set of environmental conditions, adverse or beneficial, caused or induced by the action or set of action under consideration. The industrial pollution has potential to cause irreversible reactions in the environment. Since the carrying capacity of the environment is not unlimited, ecosystems are more susceptible to adverse environmental impacts. The unplanned and haphazard location of industries might increase the risk to the environment. The impacts have been quantified based on existing control measures and the emission concentrations. The environment is a complex structure. The study of Environmental Impact Assessment is difficult and lengthy procedure besides being expensive. The accuracy of any prediction concerning the impact on the environment is isolated as a whole may not be precise. Hence, relevant aspects of the environment are isolated as parameters and identification of the impact due to various activities on these parameters has been done. The typical sets of parameters adopted for this study are listed below.

1. Air Environment
2. Water Environment
3. Land Environment
4. Socio-economic Environment

The impact on each of the environmental parameter can be identified by a careful examination of each of the activities listed under operational phase for establishing cause and effect relationship between the activity and the environmental parameter under study.

The industrial developmental activities in Bidadi and Doddaballapur Bashettihalli area have on the impact on the environment both directly and indirectly. The direct impacts can be classified as primary impact where as the indirect impact termed as secondary impact. The various impacts of the industrial activities on the different environmental parameters are discussed.
4.2. Impact on Topography

The major topographical changes in the region are primary because of industrialization. Though the ancillary activities will contribute to topographical changes, but they are the smaller scale.

Industrial establishments in both the study area generate huge amount of solid waste, which are dumped on the land on heaps thereby disturbing the topography. The crusher yard has practically become a hillock. Most of the development causing deforestation, has also affected the topography due to soil erosion.

4.3. Impact on Climate

The impacts on climate due to industrial activities are much more significant as the rapid growth of industrial and commercial activities affects the macroclimate of the area. Rapid deforestation, vegetation destruction and generation of heat by the industries in the atmosphere though their respective stack emissions causes thermal pollution and erection of huge structures for both industries and commercial purposes which directly affect the climate.

4.4. Impact on Air Quality

The ambient air quality is affected by continuous relapses of toxic gases and particulates to the air through stack emissions and other processes. Among the toxic gases and particulates that industries releases, the suspended particulate matter, Sulphur dioxide and oxides of nitrogen are major pollutants. Ambient air quality depends upon the wind direction, wind velocity and the relative position of monitoring station with respect to the source of emission.

There is also impact of quarrying on the air quality. The dust generated during the quarrying operations including blasting in the surrounding area and movement of the mobile equipment’s such as dozers, shovels etc. deteriorate the air quality in the surroundings. Existence of number of industries and expansion of industrial activities created dust and air pollution in the study area. Therefore, remedial measures should be taken for settling the dust and minimizing air pollution from industrial and quarrying activities. It has been observed that SPM level in most of the times exceeded the prescribed limit. Indiscriminate discharge of industrial
emission and transportation of the materials have increased the presence of SPM in the ambient air. Depending upon the wind conditions, the dust particles are carried to different places and account for high SPM values in the study area. The major activities for the source of air pollution are dumping, unloading, transportation, crushing and dispatch operations.

The general observations on the impact on air quality in present study are: The atmosphere remains relatively clean during monsoon as most of the pollutants are washed out with rain.

The pollutant concentrations at different locations do not follow any specific trend. It depends on the wind velocity and direction. However, the concentrations are generally in increasing trend after monsoon and the air quality deteriorates more during peak winter.

4.5. Impact on Water Resources

The industrial activities affect the surface water resources both in qualitative and quantitative terms. There are major surface ware resource namely Byramangala lake (Vrishabavathi Reservoir), Bashettihalli lake located in the vicinity of the study area which gets affected by different industries. In additions to these most of the villages draw water predominately either from surface water or dug wells for agricultural purposes.

4.6. Impact on Water Quality

The factors influencing water quality in the region are predominantly industrial effluents, domestic effluents and leachates from solid wastes. The industries which are water intensive and contributing to the effluent discharges of the area are Textile and Garment industries, Dying industries, Automobile spare parts industries, Food industries, Bottling plants, Chemicaland Pharmacy industries and other small scale industries.
4.6.1. Impact on Water Quality due to Bidadi industrial area

The waste water discharges from the industries find its way to the Vrishabavathi reservoir (Byramangala Tank) a tributary of river Cauvery. During monsoon not only huge quality of water flows into the reservoir but also water becomes turbid due to presence of suspended solids from onset of monsoon.

The water quality results of Bidadi industrial effluent channel and Vrishabavathi reservoir water indicate that some of the water characteristics are not within the prescribed standards. High environmental risk is marked for the people living nearby reservoir. pH, DO at station S4 and S6 during pre monsoon, COD, BOD and hardness in all stations for all seasons, Cd at pre monsoon season, Pb in all seasons except monsoon, Fe and Mn in all seasons showing high concentration and more than the permissible limits. High COD and low DO during pre monsoon which has adverse impact on water quality on people living nearby village.

4.6.2. Impact on Water Quality due to Doddaballapur industrial area

The demand of water use by Bashettihalli industrial area is met by abstraction of ground water. This cause the depletion of ground water resources. These industries discharges industrial effluent directly to Bashettihalli Lake and small tanks causing the water unfit for further usage. Most of the water samples of lake and other small tanks are not suitable for drinking with respect to TDS concentration. TDS and alkalinity concentration are much higher than the specified standards. DO concentrations of confluence point of water body and some stations are below the permissible limit and not suitable for drinking purpose. Trace metals like Fe and Mn concentration in Bashettihalli lake water were quite higher than the permissible limits and showed high environmental risk for consumption of water by living organisms. Diseases such as jaundice are prevalent in the area and various skin diseases have been reported. The ground water quality is also affected by discharge if liquid and solid waste on to the land. The leaching of chemical from waste dumps percolates into the soil and liquid waste discharge to land cause ground water contamination.
4.7. Impact on Flora and Fauna

Flora and fauna are important components and indicators of the ecosystem. Any impact on these gets reflected on all other components of the ecosystem. The industrialization and quarrying coupled with urbanization will have their direct and indirect impacts on the ecology and environment, their by affecting flora and fauna of the area. The opening of the new industries followed by the expansion of the existing industries and quarrying area encroaching upon virgin lands and agricultural fields affects flora and fauna of the area.

4.7.1. Impact on Flora

Industrialization has adverse impacts on the flora of this area such as loss of vegetation cover. Constructions of different industries at study area have adverse effect on land use and ecology due to pollution.

The indirect effect of industrialization is felt by influx of population who migrated to these areas for their employment and livelihood. To accommodate and support them and their domestic needs including firewood, the vegetative area have been encroached upon resulting in unscrupulous felling trees, which only results in environmental degradation.

The increasing number of cattle population in the study area also has their adverse effects on the flora. The increasing rearing of sheep and goats, which have been encouraged by Government Schemes have accelerated the destruction of forest.

The dust and gaseous emissions from industries and quarrying associated with transportation of dust in the atmosphere have their adverse effects on flora. Settlement of particulate matter on leaves of plants will affect photosynthesis. This will affect the growth of plants and results in decay of plants, which ultimately result in denudation of vegetative cover.

A study conducted to assess environmental impact of industrial pollution on plants and cattle, which there is stress on biodiversity of plants. The number of plant species thriving in areas close to industries is less than the number of species occurring in area away from industrial influence.
The construction of roads and infrastructure due to industrial activity as well as vehicular traffic has adversely affected the flora of the area.

4.7.2. Impact on Fauna

Destruction of habitat due to industrial activities is related to the destruction of fauna.

The various activities in the study area have destroyed the natural vegetation; as a result most of the fauna were forced to migrate. The noise levels in the area due to constant functioning of industries have adverse impact on fauna. There is a big lake near by study area, tanks in the area used to contain rich aquatic life like fish. With the advent if industrialization the aquatic life has severely has been affected due to discharge of industrial pollutants into the water bodies. Due to the discharge of polluted and toxic materials to air and water, insects and aquatic animals are generally affected. This in turn affects the birds and reptiles that are dependent on insects.

4.8. Impact on Soil

The impact on the soil characteristics in the study area is imminent because of the water pollution and air pollution. The base line soil characteristics of the study area have been discussed in the table 3.15

Soil characteristics were studied by sampling at Ten locations both the study area. Bidadi and Doddaballapur Bashettihalli industrial area. The sampling locations are BS1, BS2, BS3, BS4, BS5 and DS1, DS2, DS3, DS4, DS5 which were decided, based on the following criteria.

- To determine the impact on soil characteristics due to emissions from industrial activities.
- To determine the impact due to waste water.
- To determine base line soil characteristics of the study area.
In the entire study area, mainly four types of soils were encountered

- Red and yellow soil
- Laterite soil
- Reddish brown loamy soil
- Red sandy soil

Among those, the laterite soils and red soils mostly occupy the hill ranges composed of iron ore while the reddish brown loamy soils are generally confined to the small enclosed valleys. The thickness of the reddish brown soil is comparatively high and varies 0.5 to 2.5m. The soils are moderately plasticity have a granular have a granule to crumby texture. The upper part of the profile contains some amount of humus.

From the soil sample analysis in the study area, it was obtained that most of the soil samples are sandy clay in texture having moderate bulk density and pore space. The water holding capacity is very low and is low and is slightly acidic in reaction with a pH range from 6.3 to 6.8. All soil samples are low in salt content and cation exchange capacity. Organic carbon present with red sandy soil is very low compared to soil samples from agricultural lands. Nitrogen and phosphorous content are rather low, but potassium is well within the prescribed limits.

The industrial drains carrying wastewater from various sections of the plant are discharged indiscriminately, which are causing top soil contamination. The pond or lagoon constructed is inadequate to settle all the effluent of industries. So the overflow wastewater will render top soil contaminated with heavy metals like Zinc, Lead, Iron, Manganese and Chromium. Increase in concentrations of heavy metal was observed due to industrial activity in the area. The deposition of dust and particulate matter in the surrounding area of industries affects the percolation of rain water to the strata of the soil. This affects the soil microorganisms. Exchange of gases between atmosphere and soil gets affected. Thus it leads to a negative impact on soil characteristics.

The study area being hilly in nature, such types of crops like Ragi, Paddy, Maize, Groundnut, Sun flower and Sugarcane are cultivated in the area. Utilization
of contaminated water from Byramangala Lake of Bidadi industrial area and Bashettihalli lake for agricultural purposes subsequently increases the concentration of pollutants in the soil. But rapid growth of industrialization in the study area has adverse impact on the agriculture as most of the agricultural lands have been converted for industrial and residential use.

4.9. Impact on Socio Economic Aspects

The study area is endowed with the necessary infrastructure and resources for the development of a Auto Cluster and Auto Components Cluster in the future. Ramanagara is the hub for Silk and Sericulture activities, Textiles and Apparels can find opportunities in district. The area belongs to high labor force participation because of agriculture does not provide the main source of occupation. Available agriculture land is very scanty due to the presence of extensive reserve forest area and long run mountain ranges. There are large scale quarrying and industrial activities all around the study area.

The impact of various aspects due to quarrying and industrial activities in the study area is described as follows.

4.9.1. Impact on Human Settlements:

The human settlement has intensified in the surrounding area because of variety of industrial activities. The increase in settlements has adverse impacts on environment as it causes degradation.

4.9.2. Impact on Economic Aspects:

The employment potential of the quarrying and industrial establishments will improve economic conditions of the families of employees directly and it will provide indirect employment for those who will be engaged in contracts, business and service oriented activities. The improved economic level of people will improve the sociological conditions of the area.
4.9.3. Impact on Social Status:

As per 2011 census there are about 3.27% Scheduled Caste (SC) and 20.07% Scheduled Tribe (ST) population thus representing 23.34% population under weaker sections. Due to industrial activities and subsequent employment, the outlook of the tribal population has undergone a complete change. The increased employment levels in the weaker sections have improved their economic levels which is in turn has resulted in better social status.

Due to large number of industrial and quarrying activities in the study area, a sharp rise in population from nearby districts and states namely Tamilnadu, Andhra Pradesh and Kerala have been observed. More people means more consumption of natural resources like water, land, firewood, etc., which have adverse impacts on the environment.

4.9.4. Impact on Literacy and Educational Facilities:

As per 2011 census, the percentage of total literacy in the study area is 69.20%. High literacy rate has been achieved due to migration of educated people for taking up jobs. Some industries have opened new educational institutions in their localities for which the rate of literacy among the weaker sections has been improved. There are 4 government colleges, nine aided and private colleges presently are running which improved the rate of literacy in the study are. Higher literacy means better social status and thereby improved life style.

4.9.5. Impact on Population Growth:

The density of population has increased due to commencement of new auto techno parts based industries and quarrying in the study area. The population growth in the study area has inflicted adverse impacts on environment. Increased population growth has exerted some stress on the environment in the region.

As per 2011 census, the total population in the study area is 1,082,739, which is 5.06 more than 2001 census. The proposed major industries in the study area will provide further employment opportunities and increase the population growth.
4.9.6. Impact on Civic Amenities:

The transport system in the area has greatly been affected. The State Highway in the area has been damaged and unsafe. The rural people in the study area locked even basic amenities like water supply, proper health services and education facilities. Further the study area is devoid of any recreational facilities. Therefore the construction of new roads and reconstructions of many existing roads is required immediately to facilitate the transportation system.

4.9.7. Impact on Land use:

There is a substantial change in the land use pattern in the study area due to rapid increase of industrial activities. A large area, which was under agriculture and vegetal cover, has been diverted for establishment of industries, residential colonies, transportation corridors and solid waste waste dumps. Due to rapid urbanization in the study area, the agricultural land has also been converted for residential purposes.

4.10. Effect of pollutants on human beings and vegetation and materials

4.10.1 Introduction

Air and water pollution enters the body of the human beings and causes undesirable damage to it. The effect of air and water pollutants on human beings, vegetation and materials is discussed here as follows.

4.11. Effect of Air pollutants

Air is the essential component of the life support system. When air gets polluted, it contains impurities. All the impurities in the inhaled air do not necessarily cause harm to human health. The physical and chemical nature of the pollutants is responsible for their effect. The intensity of damage depends upon the concentration and duration of exposure.

Pollutants of various kinds cause immense harm to human health. Some cause eye, nose and throat irritation and some cause irritation of the respiratory tract causing diseases like silicosis and asbestosis. Carcinogenic agents and heavy metals present in air pollution cause cancer and metal poisoning respectively. Air pollutants
having high concentration of SO$_2$ and NOx and photochemical smog cause chronic pulmonary diseases like bronchitis and asthma. Controlling of air pollutants such as particulate matter or sulfur dioxide is essential because they have adverse effect on human health. These effects include premature death, as well as increases in the incidence of chronic heart and lung diseases. Estimates of the health damages associated with air pollution are important because they can provide both an impetus for environmental controls and a means of evaluating the benefits of specific pollution control policies.

People in the industrial zone showed respiratory problems, watery discharge from eyes, skin problems and increased incidence of oral cancer. Analysis of date shows an 8.3% of increase in respiratory diseases compared to other areas. The respiratory disease includes

Tuberculosis, wheezing, coughing and hyperactivity of respiratory canal. The age versus respiratory diseases show that children and aged people are affected most. This is in support of global research findings. It has been reported that long-term exposure to air pollutants such as nitrogen dioxide and particulate matter can cause reduced lung growth in children and the effects are more pronounced in areas where air pollution is higher. The oral cancer incidences are also common in this area, which may be related to their habits like drinking smoking and chewing.

Major three air pollutants like SO$_2$, NOx and Suspended particulate Matter(SPM) in the study area cause the following severe problems as discussed below.

### 4.11.1. Sulfur Dioxide (SO$_2$):

#### 4.11.2. Effect on Human Beings:

When SO$_2$ is inhaled, it affects the mucous membranes causing irritation of the upper respiratory tract. SO$_2$ is an irritant gas on oxidation forms Sulfur trioxide (SO$_3$), which is also very strong irritant and causes severe bronchospasms even at low concentration. The effect of SO$_2$ on human being is mentioned below.
## 4.11.3. Effects on Plants:

SO2 in air affects the essential parts of the plant. Even low concentration of SO2 kills leaf tissues causing leaf necrosis and affect leaf edge and veins of the plant. When stomata remain of SO2 in air also suppresses the growth and yield of some plants. The list of some sensitive trees is mentioned below where concentration of SO2 causes damage.

### 4.11.4 Effect on Materials:

Atmospheric SO2 affects metals like iron, steel and zinc etc. SO2 in air on oxidation forms Sulfur trioxide (SO3) and further on contact with atmospheric moisture forms Sulfuric acid (H2SO4). This acid formed corrodes iron, steel etc and attacks carbonates containing substances like marbles, limestone, mortar and roofing state. The bleaching property of SO2 also affects paper, textile fibre and leather etc.

### 4.11.5. Nitrogen Oxides (NOₓ):

The oxides of nitrogen i.e. nitrous oxide (NO) and nitrogen dioxide (NO2) are both potential health hazard. It is evident that NO₂ is four times more toxic than NO. Nitrous Oxide in air is converted to NO₂ as former is an unstable compound.

Among males, in none of the economic groups the differences in the prevalence rates of chronic chest symptoms were statistically significant. Among females for chronic cough and chronic phlegm, the prevalence was significantly greater in the higher economic groups in residents of medium-high pollution zone as compared to the low pollution zone. In non-smoker males, when economic status

### Table: Concentration in ppm vs. Effect

<table>
<thead>
<tr>
<th>Concentration in ppm</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>Least amount detected by odour</td>
</tr>
<tr>
<td>8-12</td>
<td>Least amount causing immediate throat irritation</td>
</tr>
<tr>
<td>20</td>
<td>Least amount causing immediate eye irritation</td>
</tr>
<tr>
<td>50</td>
<td>Maximum allowable limit for prolonged exposure</td>
</tr>
</tbody>
</table>
and age group considered the occurrences of cough, chronic phlegm dyspnea and wheezing, no consistent pattern was evident with regard to their association with air pollution. Among non-smoking females however, in most age groups by economic status, cough and chronic phlegm were significantly more common in residents of medium-high pollution zones as compared to residents of low air pollution zone. However, for dyspnea and wheezing, no consistent pattern was evident with regard to their association with air pollution. The prevalence of chronic obstructive Pulmonary Disease and Chronic Bronchitis was greater in male subject in the middle and higher economic classes, and in female subjects all the three economic classes in the medium-high pollution zone as compared to the low low pollution zone. However, the differences were not statistically significant. The differences in prevalence rates of bronchial asthma between the pollution zones were not consistent or significant in either males or females.

4.11.6. Effects on Human Health:

\[ \text{NO}_2 \text{ causes the significant damage to human health, NO}_x \text{ like carbon monoxide attacks the hemoglobin of blood and reduces the oxygen carrying capacity of blood.} \]

\[ \text{NO}_x \text{ affects the human beings on exposure as described as follows.} \]

| Concentration of NO\textsubscript{x} in Exposure time Effect |
|-----------------------------|----------------|
| 50-100ppm                   | 10 minute – 1 hour Burning of Lung tissues at least for 6-8 weeks |
| 150-200ppm                  | 3 to 5 weeks Bronchitis |

4.11.7. Effects on Plants:

The plant gets damaged as the oxides of nitrogen are converted to PAN (peroxy acetyl nitrate). \( \text{NO}_x \) cause leaf spotting and damage to plant tissues, which ultimately reduce the rate of photosynthesis.

4.11.8. Effect on Materials:

\( \text{NOx} \) have adverse impact upon dyes. The textiles dyes used on acetate rayon, cotton and viscose rayon get faded when exposed to oxides of nitrogen. The cotton
fibres loose its strength. NO₂ forms acid aerosols in the atmosphere and damages the nylon materials.

There has been growing concern over the problem of increasing ambient air pollution in Bangalore district. The vehicular traffic has increased enormously contributing a major share to the burden of pollution. However, the impact of such intervention on public health cannot be assessed without rigorous monitoring systems in place. Monitoring of various pollutants in Bangalore rural industrial areas is still scanty and incomplete.

4.11.9.Particulates:

Particulates are known as combination of small solid particles and liquid droplets. Particulates, when present in air in excess cause serious air pollution

4.11.10.Effect on Human Beings:

Depending on the nature of the particulates or the adsorbed materials (i.e. gas or other substances) they exert a toxic effect. Particulates enter the human body through the respiratory tract and then it enters the blood system or lymph system through the lungs. Particulates in the size range of 0.5 to 5.0 microns in diameter are deposited in lungs and in the size less than 0.5 microns in diameter reach and settle in the alveoli.

4.11.11.Effects on Plants:

Particulates when deposited on the surface of the leaves of the plant, it form a thick crust and inhibits in the process of photosynthesis and causes the upsetting of the process of CO₂ exchange with the atmosphere. Hence it inhibits the growth of the plant.

4.11.12.Effect on Materials:

Particulates can have profound effect causing damage to the materials. The magnitude of this effect depends upon the chemical composition and physical state of the particulates. Particulates having Sulfur containing compounds accelerate corrosion and cause damage to buildings, sculpture, other structures and painted surfaces.
Particulates in the air influence the solar radiation and the soiling of textile materials are due to the harmful effects from the particulates.

4.12. Effect of Water Pollutants:

Water is vital for the existence of life and gets polluted by addition of undesirable foreign materials to it. Water gets polluted generally in two types in the study area as follows.

1. Water pollution due to sewage discharge.

2. Water pollution due to industrial waste discharge.

4.12.1. Water Pollution due to Sewage discharge:

The biodegradable organic content in sewage water helps bacteria to grow rapidly in surface water; hence the dissolved oxygen in surface water is consumed rapidly. As a result there is no or less dissolved oxygen in water, which hampers the growth of aquatic life and fish in the surface water.

Secondly the sewage water is very rich in various harmful bacteria and hence the surface water has been a potential carrier of pathogenic microorganisms, which endanger health, and life of human beings. The most common pathogens transmit diseases through water causing water borne diseases like dysentery, cholera and typhoid etc.

Sewage water containing the plant nutrients like phosphorous and nitrogen is discharged to surface water, which causes the rapid growth of the aquatic plants. These nutrients also trend to accumulate in ground water by leaching. As the ground water moves laterally and reaches the surface water, these nutrients are added to the existing nutrient content of the surface water; hence nutrients help in rapid growth of aquatic plants which interfere with the water quality. When aquatic plants decay, they increase the organic content in the water. This situation leads to eutrophication and aging of lake.
The steps of eutrophication can be summarized as follows.

1. Sewage from drainage increases the fertility of water.

2. The increased fertility leads to growth of aquatic organisms both plants and animals.

3. As living matter increases, organic deposits pile up on the bottom.

4.12.2. Water Pollution Due To Industrial Waste:

Different chemical discharged along with the effluent of the industry either have long term or immediate effect on living beings including plants.

The effect of the some of the water pollutants is described below.

4.13. Effect of Heavy Metals:

Most of the essential elements like Manganese, Nickel, Mercury, lead, Chromium, Iodine and Cobalt when present in excess are also toxic. Detailed effects of heavy metals on living beings are discussed below.

4.13.1. Mercury:

Mercury has a tendency of bioaccumulation, as it is not dissolved easily. It mainly accumulates in the aquatic life present in mercury-contaminated water. For example the fish in mercury-contaminated water contains more mercury than the concentration of mercury in the water. Therefore, the mercury enters the food chain. All mercury compounds are toxic to living beings when present in sufficient quantities. Inorganic mercury tends to accumulate in liver and kidney of human beings which are ultimately damaged. Mercury also affects the brain and central nervous system.

4.13.2. Lead:

Lead acts as a slow poison. About 90% of the lead retained in the body enters the bones. Lead strongly binds the large number of molecules such as RNA, DNA, many enzymes, amino acids and haemoglobin etc. in the body. The effect of lead
toxicity includes hypertension, hyperactivity, brain damage and blood synthesis etc. of the human beings.

4.13.3. Arsenic:

Arsenic is a severe element. It damages the liver and pancreas gland of the body.

4.13.4. Nitrate:

The water containing high concentration of nitrate is used for drinking purposes causes changes in the hemoglobin content of red blood corpuscles (RBC) and hence reduces the capacity to carry oxygen in the blood. The blue baby diseases are common among the infants by taking nitrate containing drinking water.

4.13.5. Oil and Grease:

Oil does not mix with water. Once oil is discharged to the water body some evaporates, some becomes emulsion and some spreads on the surface. Oil pollution causes coating on the surface as well as it imparts toxicity. The effects caused by coating and asphyxiation are reduction of light transmission and obstruction in the photosynthesis of aquatic flora, reduction of dissolved oxygen due to hindrance of surface aeration and finally damage to water birds due to coating of oil on the feather reducing their buoyancy and preventing flight.

4.13.6. Acid and Alkaline Waste:

All the water quality parameters deteriorate once acid and alkaline wastewater is discharged to the water body.

Acid and alkaline wastewater directly affects the alimentary canal of living beings. The acidic and alkaline effluents also corrode materials coming in contact with the waste. The plant cells die in acidic and alkaline effluent. It kills aquatic life because of its corrosive property.