

**WATER RESOURCES COMMISSION**

**FINAL DRAFT**  
**BUFFER ZONE POLICY**  
**for**  
**Managing River Basins in Ghana**

Final Draft, August 2008

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# **1. BACKGROUND AND CONTEXT**

## **1.1 Introduction**

Riparian vegetation extends along the catchment landscapes of the water bodies in Ghana and provides a wide range of socio-economic and biophysical functions. However, human induced activities such as un-controlled logging and mining activities, human settlements, urbanization, livestock populations, and poor agricultural practices have degraded the vegetative cover at headwaters and along the banks of many river systems and other surface water bodies. These poor and unsustainable management practices are jeopardizing the physical quality of the environment, the hydrological and ecological support systems and the livelihoods of local inhabitants around these water bodies. The above activities have further exposed most of Ghana's rivers and water bodies to the vagaries of the weather, and may as a result, account for the many streams and rivers, which used to be perennial, but are now experiencing periodic drying up.

Reduced vegetation cover along streams has resulted in increased sediment and nutrient loading of streams, which coupled with an accelerated pollution from domestic and in some cases industrial waste implies a marked decrease in the quality of the natural water bodies.

Furthermore, given that West Africa is among the most vulnerable regions to climate change worldwide, the disastrous impact of the frequent climate variability and extreme events in the past thirty years is a striking illustration of the intensification of rain storms and instantaneous local runoffs and stream flows. In addition, the recurrent droughts in the region also continue to accelerate desertification southwards altering seasonal cycles. It is therefore anticipated that the most degraded rivers and streams both perennial and intermittent are more likely to be more susceptible to the potential impacts of the global climate change.

### **Functions**

Buffer zones as used in this context refer to the existence of physical areas that separate either two ecological systems or an ecological system from other land uses or border a water body. The functional aspect of Riparian Buffer Zones (see section 1.2, definition 1) can be categorized into natural (referred to herein as ecological) and human services (referred to herein as socio-economic).

### **Ecological functions**

- Riparian buffer zones have capacity to improve water quality by trapping sediment and chemicals (fertilizers, pesticides, heavy metals) from runoff before they reach water courses, wetlands, lakes and reservoirs;
- moderate flooding, help recharge groundwater and prevent soil erosion;
- create shade with lower water temperatures as a result, and hence improve habitat for aquatic organisms;

- provide a source of detritus and large woody debris for aquatic and terrestrial organisms;
- provide food, nesting cover and shelter, and also “connecting corridors” that enable wildlife to move safely from one habitat to another;
- increase carbon storage

#### **Socio-economic functions**

- provide local community dwellers with valuable timber and alternative sources of income from non-timber forest products (NTFPs) such as forage, fruits and alike;
- help stabilize stream banks by the inclusion of mostly indigenous multi-species of plants in the vegetative cover that in addition are traditionally harvested for medicine and material for building;
- conserve natural scenic areas of recreational value within and adjacent to riparian areas for the benefit of the community in terms of cropping and ecotourism; and
- Filter impurities from water and thereby making it possible for local communities to obtain potable water supply at no cost;
- support fish populations traditionally caught as an important food item in many fishing communities;
- Marginal parts of riparian zones are being used for grazing and watering for livestock especially during the dry season.

The most important factors to be considered in relation to the establishment of an effective buffer for water quality and habitat maintenance are the catchment conditions, e.g. slope and land cover, and “design” of buffer, e.g. width and choice of vegetation and the education of nearby communities.

Riparian areas differ from the uplands because of their high levels of moisture, frequent flooding and unique assemblage of plant and animal communities. Through the interaction of their soils, hydrology, and biotic communities, buffers maintain many important physical, biological and ecological functions as well as important socio-economic benefits.

Government is formulating this policy with the intent to protect, regenerate and maintain the native /established vegetation in Riparian buffer zones to improve water quality by instituting proper procedures for managing and controlling the above activities along river banks and generally in catchments of surface water bodies. The document serves to clarify the requirements for water quality and to outline a national policy on buffer zones as part of managing Ghana’s river basins in an integrated manner and in accordance with the Integrated Water Resources Management approach and to harmonize traditional and existing public institutional standards on buffer zones in Ghana.

Under Act 522 (1996) Section 35(f), the Water Resources Commission (WRC) may by legislative instruments make regulations to facilitate a proper operational environment for its mandated functions. Hence, the intention is that the buffer zone policy in tangible terms should be backed politically and administratively in the form of the enactment of a legislative instrument (LI) as appropriate to ensure compliance as stipulations in the policy, and consequently aimed at correcting conditions which adversely affect water quality from land degradation.

## 1.2 Definitions

- 1) 'Riparian Buffer Zone' - A riparian buffer zone generally encompasses undisturbed native strip of vegetation either original or established that borders streams and rivers, ponds, lakes and wetlands and is therefore the interface between terrestrial and aquatic ecosystems. It may include trees, shrubs, herbaceous plants and grasses extending from the defined edge of a stream, river or shoreline. To conserve these resources of considerable importance, require that buffer zones are designated to the maximum extent practicable and include best management practices that will ensure the maintenance and integrity of the waterway, biota, and habitats and reduce pollution that would result in water quality improvement and fresh water supply at low cost from well preserved water bodies.
- 2) 'Shall' the word 'shall' in this document is mandatory and not discretionary and the word 'may' is permissive.
- 3) 'Native Vegetation'- A plant whose presence and survival in a specific region is not due to human intervention or is non-invasive.
- 4) 'Sediment'- Solid material, both mineral and organic, that is in suspension, or in bed load, is being transported, or has been moved from its site of origin by water, wind or gravity and has come to rest on the earth's surface either above or below sea level.
- 5) 'Channel'- A natural or artificial watercourse with a definite bed and banks that conveys flowing water continuously or periodically.
- 6) 'Flooding'- When water overflows its channel and spreads in to areas beyond the normal flow channel. This may result in the destruction of property as wells loss of life.
- 7) 'Erosion' - The removal of soil particles by the action of water, wind, gravity or other geographical agents, whether naturally occurring or acting in conjunction with or promoted by man- made activities or effects.
- 8) 'Stabilization'-providing adequate measures, vegetative and /or structural, that will prevent or minimize erosion from occurring.
- 9) 'Perennial stream' -A watercourse that flows throughout a majority of the year in a well defined channel.

- 10) 'Intermittent stream'-A watercourse that flows in a well defined channel only in direct response to a precipitation event. It is dry for a large part of the year.
- 11) 'Watercourse' or 'Waterway' –A permanent or intermittent stream or other body of water, either natural or manmade, which gathers or carries surface water.
- 12) 'Runoff'-Water that flows on the surface of the ground, resulting from precipitation.
- 13) 'Water pollution' –The introduction by man or nature directly or indirectly, of substances or energy into the water environment resulting in unreasonable interference with nature so as to endanger human health, harm other living organisms or interfere with amenities or other legitimate use of water.
- 14) 'Best management practices'- The physical, structural, and /or managerial practices that, when used singly or in combination, prevent or reduce pollution of water that have been approved by the Water Resources Commission and that have been incorporated by reference into this policy.
- 15) 'Drainage basin' 'River basin', 'Water basin' is the extent of the land where water from rain drains downhill into a body of water such as river, lake, reservoir, wetland, estuary, sea or ocean. The drainage basin includes both the streams and rivers that convey the water as well as the land surfaces from which the water drains.
- 16) 'Catchment' is the term used to describe the area which is drained by a river. It is also sometimes interchangeably called the river basin.
- 17) 'Geomorphologic' is the branch of geology that studies the form or characteristics, origins, alterations and development of land forms or the earth surface.
- 18) 'Eutrophication' is a syndrome of ecosystem response to human activities that fertilize water bodies with Nitrogen (N) and Phosphorous (P) often leading to changes in animal and plant (algae, weed) populations and degradation of water and habitat quality.
- 19) 'Wetland' refers to an area where plants and animals have become adapted to temporary or permanent flooding by saline, brackish or fresh water. It may include permanent flood areas with sedge or grass swamps, swamp forest, seasonal flood plains and/ or depressions without flow.
- 20) 'Recreation Areas' –Areas designated for recreational use such as parks, greenways and nature preservations.
- 21) 'Floodplain', or 'Flood plain'- is a flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, and the flood fringe, which are areas covered by the flood, but which do not experience a strong current

- 22) 'Floodway' consists of the stream channel and adjacent areas that carry flood flows,
- 23) 'Recession farming' cultivation along exposed river /stream areas as floods recede.
- 24) 'Urban area' is an area with an increased density of human-created structures in comparison to the areas surrounding it. Urban areas may be cities or towns. Urban areas are created and further developed by the process of urbanization
- 25) 'Peri-urban' literally means areas that lie at the interface between urban and rural settlements. It is distinctive in its diversity, having a mix of land uses and residents who may have jobs in nearby urban areas to which they commute

### **1.3 Challenges in introducing Buffer Zones**

Some of the main challenges facing the introduction and implementation of a buffer zone policy include the following:

- how to obtain public acceptance of the concept of using vegetation to buffer valuable aquatic resources from the impact of adjacent human use of the land;
- and in practical terms how feasible it would be to establish buffer zones of sufficient width along the targeted river/stream courses and water bodies, particularly in built-up areas where housing, commercial and other activities have been established for a long time; and
- the realization that destruction of streamside vegetation is closely linked with poverty and demographic pressure, and in this context, the introduction and in some areas the re-establishment of buffer zones be considered as an integral part of the general socio-economic development process which need equal support to make the policy implementable.

## **2. GUIDING PRINCIPLES UNDERLYING THE BUFFER ZONE POLICY**

Recognizing national perceptions and local needs as expressed in the Ghana National Water Policy and the African Water Vision 2025, the following principles have guided the buffer zone policy preparation:

- Promote an efficient and sustainable use of buffer zone resources to address food security and income generation for local communities;
- Practice integrated water resources management (IWRM) and development to ensure the sustainability of water resources in both quantity and quality, and using the catchment/river basin as the territorial unit for water resource planning and management;
- Prevent, mitigate and manage water-related events associated with potential effects of climate variability, viz. floods and droughts;

- Recognize that socio-economic activities and the livelihood of local communities is interlinked with the integrity of riparian aquatic ecosystems; and
- Encourage the involvement of local communities through a participatory approach at all levels of decision-making in the management of buffer zones is essential for their sustainability.
- It is important that the present attitudes and perceptions of Ghanaians regarding water and riparian buffer zones be changed

### **3. BUFFER ZONE POLICY OBJECTIVE**

#### **3.1 Policy statement**

Government will ensure that all designated riparian buffer zones along rivers, streams, and round lakes, reservoirs or other surface water bodies shall be adequately vegetated and sustainably managed to restore, and maintain the ecological integrity, and to provide socio-economic benefits to local communities and in fulfillment of Ghana's overall Water, Environment and land use policies, the Millennium Development goals and the Growth Poverty Reduction Strategy (GPRS 11).

#### **3.2 Overall objectives**

The overall objectives of the policy are:

- to restore and maintain the ecological and livelihood-support functions of buffer zones;
- to ensure equitable and sustainable utilization and management of buffer zone conservation areas, which will contribute to long-term well-being of both resident and downstream communities;
- to intensify capacity building, education and training of local communities and ensure their commitment to the conservation of buffer zones; and
- to harmonize and coordinate policies and laws in this field among several governmental agencies with a view to achieve maximum synergy and to integrate buffer zone concerns into the planning and decision making of other sectors.

### **4. STRATEGIES FOR IMPLEMENTING THE BUFFER ZONE POLICY**

Sections 5 to 8 of this document provide strategies for the establishment of buffer zones in the country, although it must be emphasized that such strategies also need to be adaptable and respond to the dynamic nature of socio-economic circumstances and specific localized situations like the rural-urban continuum.

The buffer zone policy emphasizes four major areas for which it sets out specific objectives and measures and/or actions within the context of the national development goals. The four identified areas are:

- 1) maintaining the ecological and life-support functions of buffer zones;

- 2) sustaining the multi-functionality of buffer zones;
- 3) building capacity through education, training and empowerment of communities on conservation of buffer zones; and
- 4) harmonizing and coordinating policies, bye-laws and traditional practices on buffer zones among government institutions and other involved parties.

The establishment of buffer zones applies to the following areas, which ideally should be identified/demarcated on a river basin riparian buffer map, viz. (i) lands adjacent to rivers, streams, lakes and wetlands, (ii) lands at the margins of municipal reservoirs.

## **5. MAINTAINING THE ECOSYSTEM FUNCTIONS OF BUFFER ZONES**

### **5.1 Introduction**

Buffer zones of intact, moderately and highly modified natural ecosystems shall be managed to ensure protection and maintenance and improvement of biological diversity and enhanced ecosystem functioning, while providing at the same time a sustainable provision of goods and services to support the livelihoods of local communities.

### **5.2 Objectives**

- to ensure the establishment of a network of riparian corridors in the river basins; and
- to protect the ecological integrity, geomorphologic, sacred or economic values attributed to buffer zones.

### **5.3 Policy measures and/or actions**

- buffer zones must be permanently reserved by legislative instruments with the consent of local authorities;
- buffer zones must be incorporated into the local land-use plans;
- minimize the risk of conversion of buffer zones to uses incompatible with sustainability of their functions; and
- exclude exploitation or occupation inimical to the purposes of designation of the areas as buffer zones.

Management of Riparian buffer zones shall include specific limitations on alteration of the natural conditions in some areas:

The following practices and activities shall be restricted within the buffer zone, except with prior approval by the Water Resources Commission/ EPA:

- 1) Clearing or grubbing of existing vegetation;
- 2) Clear cutting of vegetation or trees;
- 3) Soil disturbance by grading, striping, other practices;
- 4) Filling or dumping of waste
- 5) Use, storage, or the applications of pesticides, herbicides, and fertilizers;
- 6) Conversion of existing established vegetation from majority native to majority exotic species.

## **6. SUSTAINING THE MULTI-FUNCTIONALITY OF BUFFER ZONES**

### **6.1 Introduction**

Riparian lands provide important environmental protection, and water resource benefits. It is necessary, therefore, to protect and maintain the beneficial character of water courses, reservoirs and lakes by implementing specifications for the establishment, protection, use and maintenance strips of land along surface water bodies.

Due to their long, linear nature, riparian areas create abundant edge habitats, considered to be highly productive for many flora and fauna species, and for aesthetics and ecotourism purposes. It takes into account the intrinsic needs of local communities, including subsistence resource use in so far as these will not adversely affect other objectives of managing buffer zones.

### **6.2 Objectives**

- to manage community uses of buffer zones for cultural and economic purposes at levels which will maintain the areas in a constructive balance between local needs and buffer zone functions.
- to bring benefits and contribute to the welfare of the local community through the provision of natural products such as forest and fish, and services such as clean water or income derived from eco-tourism or other income generating sources.
- to contribute to carbon storage.

### 6.3 Policy measures and/or actions

- ***Riparian buffer zone management plan***

- Buffer zone management plan shall be prepared by a team of qualified environmental professionals. The team shall fully evaluate the effects of any proposed uses on the buffer zone system, and identify the existing conditions (vegetation, extent of flood plains and their current use, soils, slopes, etc.) as well as proposed management techniques, including any measures necessary to offset disturbances to the buffer zone system.
- The plan shall be approved by the relevant River Basin Board and concerned District Assemblies, and provide implementable information on width and demarcation of the buffer zones, ownership, how it will be managed and maintained and outlier of river bank stabilization measures, and riparian re-vegetation.
- Incorporate the application of GIS to improve buffer Zone management e.g. the use of geo-referenced maps and for information dissemination.

- ***Preservation of stream channel integrity and bank stability***

Restoration of native vegetation of trees, shrubs, herbaceous plants and grasses to promote stream bank stability. Generally, the vegetation chosen for use in the buffer zone should form an even, dense mat and should be able to tolerate periodic flooding and drought.

- Buffer zone corridors of natural vegetation help to reduce downstream effects of floods by dissipating stream energy, temporarily storing flood waters, effectively reducing the rate of flows, and in turn increasing infiltration.
- Only vegetation within at least 10 meters of the stream channel will play an important role in bank stabilization. Increasing buffer width will continue to indirectly enhance these effects by providing additional protection and stability during extreme flood events, while trade-offs are anticipated of other land uses.
- Increasing buffer width to incorporate the flood plain/wetlands also increases the potential efficiency of water storage from upstream flow during storm events.
- Intensive grazing along stream banks and watering of livestock directly from streams, ponds and other drinking water bodies causes stream bank damage, erosion and the resulting sediment transport and pollution of both usable and earmarked drinking water sources. Established riparian zones require the exclusion of livestock to streams, ponds and drinking water sources. Alternative watering points shall be established outside the riparian zones to provide water for livestock.

- ***To promote carbon storage***
  - For optimal carbon storage, native riparian species (trees, shrubs, herbaceous plants and grasses) should be selected because they have co-evolved and adapted to the site to assure strong health and vigor.
  - Trees and shrubs (non-invasive) species should be favored, with multiple values: nuts, fruits, browse, and other non-timber forest products such as cane, rattan and bamboo adapted to riverine conditions.
  - Development of species diversity with similar characteristics of riparian strips that have developed naturally in areas with high water table, tolerant to wet conditions, i.e. hygrophytic species.

## **7. RIPARIAN BUFFER ZONES IN URBAN AND PERI-URBAN AREAS**

### **7.1 Introduction**

Access to clean water is one of the most fundamental human rights, but currently a majority of the city dwelling population in Ghana lack access to clean water. The crisis is not only due to insufficient water flows but the inability of ecosystems functions to provide clean, healthy and fresh water through the filtering effect. Because natural areas (e.g. wetlands and riparian vegetation) provide clean water for free, their value often goes unrecognized and unincorporated into planning decisions.

In most urban and peri-urban areas, sensitive natural landscapes are replaced with physical structures (e.g. roads, buildings etc.) rendering the ground less able to capture water. Concrete, asphalt and rooftops do not absorb water. Instead, these impervious surfaces create runoff, directing large volumes of rainfall into gutters, trenches and canals. In the event of rainstorms, runoff overwhelms outdated sewage infrastructure, spilling raw or partially-treated sewage into waterways, causing floods and subjecting more areas prone to flooding to sewage overflows. Furthermore, the construction of unauthorised structures and or/ settlements and ecologically unfriendly activities ( mining, farming etc) on wetlands /flood plains or floodway and along river/ stream banks reduces the ability of these natural systems to hold water and control floods and as a consequence, tend to cause severe damage to property and loss of life .

Runoff also convey a variety of harmful contaminants such as pesticides, and pollution from roads, car/vehicle maintenance and wash stations, like oil, salt, sediment, rubber and other domestic and industrial waste. These contaminates impair drinking water quality and threaten public health. The situation is further compounded by the deliberate filling and dumping of solid / liquid waste into water bodies and along waterways.

As a result, urban and peri-urban streams, rivers, ponds, reservoirs and lakes become less suitable for drinking and less able to support the aquatic ecosystems.

Contaminated drinking water has to be filtered and treated before public use which is increasingly becoming more expensive to do with more polluted water.

A subsidiary intent of this policy is to buffer all natural landscapes in urban areas including waterways in city centers to help ameliorate sewage overflows and water contamination, and integrate natural areas into urban planning.

The initiatives outlined in this section of the policy are in conformity with the United Nations Millennium Development Goal that is geared towards halving by the year 2015 the proportion of people who are unable to reach or afford safe drinking water and who are without access to basic sanitation. It is also in recognition of the Millennium Ecosystem Assessment (2005)'s estimates that approximately 60 percent of the world's ecosystem services are currently being degraded or used unsustainably.

## **7.2 Objectives**

- to encourage the restoration and protection of riparian ecosystems and the corridors that link them to flood plains/wetlands
- to reduce unsustainable land use practices and pollutant loads to water bodies and waterways to improve fresh water supply in urban areas
- to preserve or establish green spaces as riparian buffers along waterways in areas with practical difficulty in regeneration and reforestation of riparian vegetation as a more efficient way of preventing drinking water contamination and flooding
- to promote the recognition of the value of environmental services and sanitary implications

## **7.3 Policy measures/ or actions**

- Protect, restore and maintain riparian buffers and flood plains as natural and long term defenses against the harmful effects of floods.
- Enforce the zone of no development area to streams and water bodies by the removal, demolition and the prohibition of unauthorised structures and incompatible land use practices on flood plans, fringes and corridors.
- Manage runoff as close to the source as possible by trapping rain water or by directing runoff to natural infrastructure such as gardens, and green parks.
- Promote the development/establishment of green spaces with native grass along waterways and to protect them from future development and environmental damage by restricting the zone from the removal of soil, trees and other natural features except for purposes of conservation, research, recreation or uses accessory to permit uses.
- Encourage approved edge gardening and flood recession farming only for purposes of mitigating erosion and water pollution and for sustenance of livelihoods.

- Encourage a sense of municipal and community ownership of green spaces and provide local communities access to green space facilities (recreational parks, walkways etc.) at all times.
- Ensure that economically important trees such as bamboo and fruit trees (e.g., mango, coconut, palm nut, pawpaw and rubber) are planted along and within the buffer for the benefit of local communities

## **8. CAPACITY BUILDING OF COMMUNITIES ON CONSERVATION OF BUFFER ZONES**

### **8.1 Introduction**

There is the need to ensure national awareness creation and appreciation of the concept of riparian buffer zones as areas where human needs and ecological services are in a delicate imbalance and require public's commitment for their conservation.

### **8.2 Objectives**

- to provide environmental education, training, and awareness creation at all levels in order to acquaint the public with the concepts of riparian buffer zone conservation; and
- to build capacity and empower community-based organizations to protect and manage buffer zone resources in collaboration with district and municipal assemblies and other user groups.

### **8.3 Policy measures and/or actions**

Buffer zone development and management should be based on a participatory approach, involving users, planners, and policy-makers at all levels, and aim for a strong sense of community empowerment. The following aspects need to be considered:

- agree on a vision for the buffer zone concept, and promote public/community participation in the planning and decision-making process related to buffer zone resources;
- provide goods and services for participating communities which depend on a mixture of agricultural and forest resources to maintain their livelihood;
- enhance public participation through education and awareness programmes in schools and local communities;
- clarify and deepen the understanding of buffer zone values through traditional as well as modern communication techniques at all levels;
- provide technical and financial support as well as economic incentives to local community groups for buffer zone management and conservation, and strive to

achieve equitable benefit-sharing among stakeholder groups accrued from the buffer zone establishment<sup>1</sup>.

## **9. HARMONIZING AND COORDINATING POLICIES, BYE-LAWS AND TRADITIONAL PRACTICES ON BUFFER ZONES**

### **9.1 Introduction**

With accelerated development, the needs of communities tend to shift from the once treasured traditional buffer zone norms towards other economic gain-driven usages of river banks. This paradigm change often results in practices, which can lead to pollution and degradation of the buffer strip flanking the river especially those close to or flow within highly populated settlements. Traditional rulers and local communities must enforce customary bye-laws on buffer zones.

In addition to the traditional practices towards protecting the river system, a great number of policies, bye-laws and regulations concerning buffer width have been introduced over the years by various departments and agencies, but by and large all from a sectoral point of view, and hence, not coordinated. An overview of existing buffer zone bye-laws and specifications is presented in the Appendix 2.

In general, it can be concluded that existing buffer zone arrangements in Ghana varies from 10m to 100m. Any effort to determine a minimum buffer width that could sustain the river ecosystem and harmonize various organizational buffer zone stipulations should dwell in this range.

### **9.2 Objectives**

- to create a buffer zone regulation, which in a balanced manner incorporates the various specifications as given in existing regulations and other specifications; and
- to be flexible and “dynamic” in its stipulations to fully accommodate local community livelihood needs and requests and practices as well as traditional views in establishing and managing buffer zones.

### **9.3 Policy measures and/or actions**

- ***Recommended buffer zone widths***

As much as possible a 3-tier buffer zone should be the norm for effective erosion control and halting of water quality degradation caused by nutrients, animal/human wastes, sediments and run-off. In Appendix 1, a visual description of the 3-tier buffer zoning principle is presented. In many cases, however, the optimum buffer “design”, its width, etc. will vary considerably from the prescribed values along the length of a stream system due to changes in the flow regime (stream order), land uses, and to accommodate local requirements etc.

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<sup>1</sup> *There is the need to build incentives into buffer zone conservation management plans comparable to incentives given to forest fringe communities living around Globally Significant Biodiversity Areas (GSBAs), which is the case for some 30 forest reserves in Ghana.*

- A) The desired minimum buffer width should be able to sustain stream protection and buffer functions over the long term, and potential future threats (like climate change), which may tend to impact negatively on runoff regime and the integrity of stream-side vegetation. Moreover, landowner concerns will most often serve to constrain the width of the buffer zone, while reserving enough land for food cropping or pasture management.

### **Design Standards of for Riparian Buffer Zones**

The recommendations on buffer widths are:

- municipal reservoir shoreline protective buffer: 60 to 90 meters (e.g. Weija Dam, Lake Bosomtwe);
  - major perennial rivers/streams: 10 to 60 meters (e.g. Volta, Tano, Offin),
  - minor perennial streams: 10 to 15 meters;
  - important intermittent streams: 10 to 20 meters; and
  - streams within forest reserves: 10 to 50 meters.
  - Wetlands will require a buffer zone of 30-meters around the perimeter as defined from the high water elevation.
- B) Furthermore, in the 3-tier zoning concept, the forested buffer widths shall be modified if there are steep slopes within close proximity to the river system, and in those cases, the buffer may be adjusted as follows:

<u>slope</u>	<u>width of buffer</u>
15-20 %	add 3 meters
20-25 %	add 10 meters
25-30 %	add 20 meters

- C) If the land use or activity involves aboveground storage of hazardous substances or petroleum facilities, the buffer zone width shall be adjusted to include an additional 30 meters.
- D) If land use or activity in the vicinity involves solid waste landfills or junkyards, the buffer zone width shall be adjusted to include an additional 20 meters
- E) If the adjacent land use involves surface discharges from a wastewater treatment plant, land application of bio solids, or animal waste the buffer zone shall be governed by an enacted pollution control regulation.
- F) If the land use involves animal feed lot operations or intensive chemical based farming, the buffer zone width shall be adjusted to include an additional 20 meters

- G) If the land use involves flood recession farming where the community uses the high fertile floodplains for farming, the Water Resources Commission may consider a variance to the buffer zone width.

Increasing interagency liaison and communication between the Water Resources Commission, the Ministry of Lands, Forestry and Mines, the Environmental Protection Agency, the Hydrological Services Department, the Ghana Institute of Surveyors, the Volta River Authority, The Irrigation Development Agency, the Ministry of Women and Children's Affairs, District Assemblies, NGOs and other stakeholders regarding proposed buffer zone establishments shall help in harmonizing the various specifications and stipulations. The present buffer zone policy is an attempt to rectify the prevailing situation in this regard.

- ***Role of government departments and agencies***

- buffer management plans will be prepared for all river basins showing existing and “proposed” buffer areas, and proposed management techniques;
- using agricultural and forestry extension staff to improve understanding of buffer zone processes and benefits; and
- support research for buffer zone management.

Buffer zone research must be oriented for achievement of the buffer zone objectives, e.g.:

- encourage the use of native species of flora and fauna;
- maintaining certain stages of plant re-growth and succession;
- monitoring effects of grazing/agricultural uses, timber harvesting economy
- demonstrate achievements through partnership approaches – District Assemblies/NADMO/NGOs and local communities; and
- support research to develop cost-effective methods of establishing buffer zones.
- support natural farming practices that minimize erosion and avoid inappropriate use of chemicals.

- ***Role of district/municipal assemblies***

The existing decentralized administrative structure in the country is a useful framework within which the participation of local communities will be solicited.

- the district assemblies will seek to establish, where appropriate, specific by-laws and legislative instruments declaring buffer zones as “protected areas” to ensure the conservation of unique riparian areas, including sacred groves and stream beds in their respective localities;
- the buffer zone conservation must conform to the land use classification in the district/municipality; and
- buffer zone restoration shall be reflected in the environmental planning initiatives at district and municipal level.

- ***Role of traditional rulers***

- traditional land owners (heads of traditional paramount stools) to facilitate public awareness raising and issue directives concerning land to be set aside for buffer zoning;
- long-term management of buffer zones on communal land should evolve ultimately into full community ownership of these buffer areas; and
- setting-up of buffer zones development committees, spearheaded by NGOs and CBOs.

- ***Legislative initiatives***

Government agencies may make regulations pertaining to restrictions on development activities and utilization of buffer zones, including:

- Construction and commercial activities:
- Stream banks and other areas within the riparian buffer zone shall be left in a stabilized condition upon completion of development activities. The vegetative condition of the entire buffer zone shall be monitored and landscaping or stabilization performed to repair or control soil erosion during and after construction to minimize turbidity of the river water by following minimum requirements wherever practicable. Roads should as far as possible be located away from natural drainage channels.
- The selection of stream crossing points which will involve a minimum of disturbance to banks and existing channels or the angle of crossing shall be perpendicular to the stream or buffer in order to minimize clearing requirements. Where possible, the design of roadways and lots within a development should be aligned such that all streams are either to the rear or the side of individual lots, never along the front.
- Building of physical structures shall not be allowed in the riparian buffer zone with the exception of open type recreation areas, green park facilities and walking trails as approved by the Water Resources Commission.
- Avoidance of excessive cuts and waste dirt accumulations which will tend to block natural drainage. To this effect, individual trees within the Riparian Buffer Zone may be cut down if in danger of falling, causing damage to dwellings or other structures, or causing blockage of the stream. The remaining root wad or stump should be left in place, where feasible, to maintain soil stability and in-stream habitat. Requests to remove unsightly or undesirable trees that are not in danger of falling, causing damage to dwellings or other structures, or causing blockage of the stream may be made to the Water Resources Commission on a case to case basis. The tree removal requests should not cause damage to the stream bank or the overall effectiveness of the stream's tree canopy. Should the Water Resources Commission approve a tree removal request then replacement trees shall be planted.

- Clear restriction of commercial activities with likely negative impact on water bodies, like repair and washing of vehicles.

- Logging and harvesting:

A logging code requires a buffer zone to be established of sufficient width to confine within the zone any visible sediment resulting from accelerated erosion.

Selective harvesting in buffer zones will also often leave a residual stand of trees on the area at all times, and will tend to reduce the extent of disturbance and runoff.

With sawmill operations, no person shall dump any saw dust, shavings and other waste into any stream, lake or reservoir.

- Farming practices:

Good agronomic practices, low external input use and proper cultivated catchment areas can reduce sediment yield and other pollutants before drainage water enters streams or reservoirs.

Where vegetation cover is removed for agriculture, the slope must be terraced to stabilize the slope and prevent erosion.

Where in urban areas natural vegetation does not provide sufficient protection to water bodies from indiscriminate waste dumping or car washing, controlled farming can provide better protection.

Livestock watering shall be limited to certain points or excluded from the riparian area as necessary to achieve buffer zone objectives.

Controlled grazing of livestock may be permitted in marginal areas outside stream areas as a public amenity

- Water pollution hazards:

The following land uses and/or activities are designated as potential water pollution hazards and must be setback from any stream or water body by the following distances:

- (1) storage of hazardous substances – 45 meters
- (2) raised septic systems – 75 meters
- (3) solid waste land fills – 90 meters

## **10. Exceptions and Variances**

A) This Riparian Buffer Zone policy shall apply to all proposed development and redevelopment except for a development in which the construction plans were approved by the Town and Country Planning Department prior to the effective date of this policy.

B) The Water Resources Commission may grant a variance for the following:

1) Those projects or activities where it can be demonstrated that strict compliance with the policy regulations would result in practical difficulty or financial hardship; or

2) Those projects or activities serving a public need where no feasible alternative is available; or

3) The repair and maintenance of public improvements where avoidance and minimization of adverse impacts to wetlands and associated aquatic ecosystems have been addressed.

C) The Water Resources Commission may consider a variance to the buffer width at restrictive locations and may allow the buffer to be narrower or wider at some points as long as the width is not reduced to less than ten (10) meters perpendicular from the top of bank at any location, and the overall average width of the buffer zone meets the minimum requirement set forth in the Design Standards for the Riparian Buffer Zone.

D) For any other reason than smallholder livelihood support, the applicant shall submit a written request for a variance to the Water Resources Commission.

1) Specific reasons justifying the proposed variance and any other information necessary to evaluate the proposed variance request shall be made to the Water Resources Commission /District assemblies.

2) The Water Resources Commission /District Assemblies may require an alternative analysis that clearly demonstrates that no other feasible alternatives exist and that minimal impact will occur as a result of the project or development in the buffer zone.

3) When considering a request for a variance, the Water Resources Commission/ District assembly may require additional information to establish that water quality best management practices are in place to reduce adverse impacts on water quality.

### **Conflict with Other Regulations**

Where the standards and management requirements of this Riparian Buffer Zone Policy is in conflict with other laws, regulations, and policies regarding streams, steep slopes, erodible soils, wetlands, floodplains, timber harvesting, farming, mining and other land disturbance activities, or other environmental protective measures, the most restrictive requirements shall apply.

## 11. POLICY IMPLEMENTATION ARRANGEMENTS

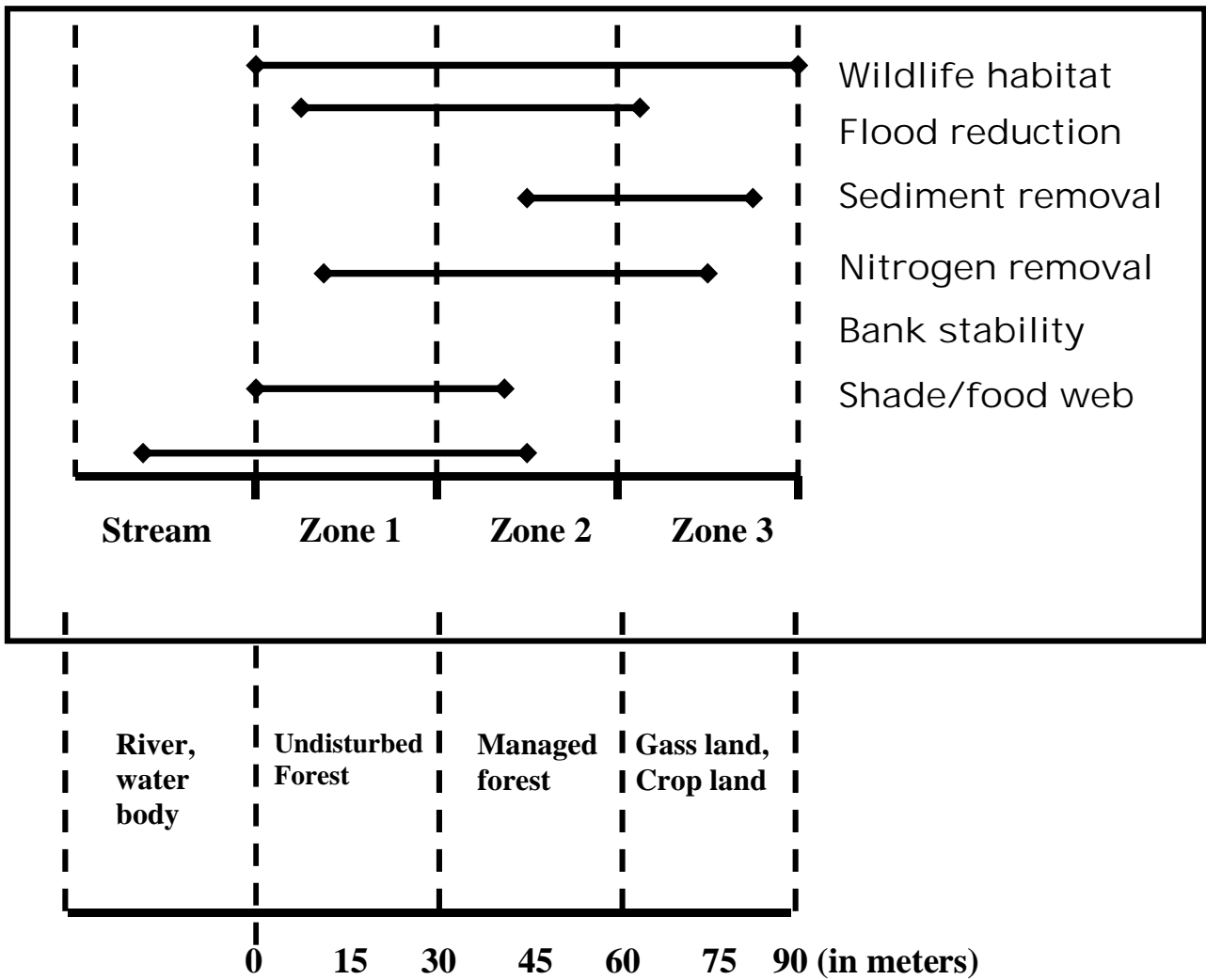
An important aspect of supporting the implementation of the Buffer Zone Policy is ensuring effective inter-institutional coordination and collaboration. This is achievable by identifying and defining the roles and responsibilities of the various involved parties at national and local levels.

The partners in implementation of the buffer zone policy can be grouped as follows:

- Water user and development agencies:
  - Community water and Sanitation Agency
  - Ghana Water Company Ltd.
  - Irrigation Development Authority
  - Volta River Authority
- Data collection and research institutions:
  - Hydrological Services Department
  - Ghana Meteorological Agency
  - Water Research Institute (CSIR)
  - Universities, renewable natural resources institutes
- Regulatory agencies:
  - Water Resources Commission
  - Environmental Protection Agency
  - Forestry Commission
  - Lands Commission
  - Fisheries Commission
  - Minerals Commission
  - National Development Planning Commission
  - Public Utilities Regulatory Commission
- NGOs and CBOs (national and international)
- Bilateral donors, UN organizations and other international agencies

# APPENDIX 1

## Functions Provided by 3-Tier Buffer Zoning System



## APPENDIX 2

An overview of existing buffer zone bye-laws and specifications is presented in the following table.

Organization	Buffer Zone Arrangement
<b>Forest Services Division</b>	<b>No logging within 50m of major streams and 25m along smaller streams.</b>
<b>Wildlife Division (Protected Areas)</b>	<b>Three-tier buffer concept, i.e. core zone, support zone and management zone; however, no buffer zone width specified.</b>
<b>Town and Country Planning Department</b>	<b>300m wide area between adjoining stream or water body as no development area.</b>
<b>Ministry of Lands, Forestry and Mines</b>	<b>Minimum of 100m off water mark should be declared as protected areas</b>
<b>Ghana Water Company Limited (GWCL-Weija)</b>	<b>For Weija reservoir, approximately 15m (50ft) contour line above mean sea level, which determines the reservoir buffer area.</b>
<b>Hydrological Services Department</b>	<b>From 10m to 30m along both banks of major drains and water courses in Accra-Tema metro area.</b>
<b>VRA, IDA, EPA, DAs, Land/Water Management Unit of MOFA, NGOs (GOFA, ADRA, Green Earth – Ghana) and local communities (Operekrom and Densuano)</b>	<b>Not well documented/ not clearly defined.</b>