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SUBJECT : **GUIDELINES FOR WATER QUALITY MANAGEMENT AREA ACTION PLANNING AND LOCAL GOVERNMENT UNITS COMPLIANCE SCHEME**

In line with the standardization of procedures/protocols on Water Quality Management Area (WQMA) Action planning, these Guidelines for Water Quality Management Area Action Planning and Local Government Units Compliance Scheme are hereby issued.

In view thereof, all EMB Regional Offices are hereby directed to use these Guidelines for guidance in the preparation of the WQMA Action Plans for designated WQMAs.

For your immediate compliance.

ATTY. JUAN MIGUEL T. CUNA, *CESO IV*
OIC-Director

GUIDELINES FOR WATER QUALITY MANAGEMENT AREA ACTION PLANNING AND LOCAL GOVERNMENT UNITS COMPLIANCE SCHEME

The basic policy of the Philippine Clean Water Act (CWA) of 2004 or Republic Act 9275 is articulated in Article 1, Section 2, which states that: *"The State shall pursue sustainable economic growth and development in a manner consistent with the protection, preservation and revival of fresh brackish and marine waters"* using the framework for sustainable development. The Integrated Water Quality Management Framework, which was formulated through proper delegation and effective coordination of functions, will provide a comprehensive management program for water pollution focusing on pollution prevention. This can be best achieved through the designation of water quality management areas (WQMAs) and the eventual creation of the WQMA Governing Boards (GBs).

The WQMAs are designated as part of the water quality management system as provided in the entire Chapter 2 of the CWA. Its aim is to improve water quality through abatement and control of pollution loads from the various kinds of pollution sources. Hence, Chapter 3, Sec. 19 of the CWA, provides that the Department of Environment and Natural Resources (DENR) shall *"prepare a ten-year Water Quality Management Area Action Plan within twelve (12) months following the completion of the framework for each designated water management area."*

The WQMA Action Plan shall be consistent with the Integrated Water Resources Management Plan (IWRM Plan) for the area (watershed, river basins or parts thereof) where the WQMA is located as well as the Integrated Water Quality Management Framework (IWQMF).

For proper delegation and effective coordination functions, Chapter 3, Sec. 19 of the CWA further provides that *"the Department shall gradually devolve to the local government units (LGUs), and to the GBs the authority to administer some aspects of water quality management and regulation"* such as permit issuance, monitoring and imposition of administrative penalties, when the DENR has determined that the LGU or the GB possesses the technical capability to undertake such functions.

Rule 20.1 of the Implementing Rules and Regulations (IRR) of RA 9275 defines the role of the LGU in WQMA Action Planning. The IRR states that *"the local government unit shall prepare, within 6 months from receipt of the WQMA Action Plan, a compliance scheme listing activities and timetable for achieving the objectives of the WQMA Action Plan in their territorial jurisdiction. The compliance scheme shall be presented and discussed by the governing board to ensure consistency with the WQMA Action Plan and complementation with compliance schemes of contiguous LGUs. The Department shall actively encourage LGUs to participate in the process of designation of WQMAs and the Governing Board."*

SECTION I. POLICY

It is the policy of the DENR to provide the information that would ensure the process for WQMA Action Planning and the preparation of LGU Compliance Scheme, so that these are done uniformly. In addition, technical requirements and participatory approaches to direct the users in effectively planning, implementing and monitoring the WQMA Action Plan and LGU Compliance Scheme are also provided for use by the Environmental Management Bureau (EMB) Regional Offices (RO), the LGUs and other stakeholders.

SECTION II. OBJECTIVES

1. To provide the process through which a WQMA Action Plan and LGU Compliance Scheme are formulated and implemented. This fulfils Sections 19 of the CWA and its IRR that states: *"The Department, through its regional offices, in coordination with NWRB, members of the local government units (LGUs) and other concerned sectors, shall, within twelve (12) months following the completion of the Framework, formulate a ten (10) year water quality management area action plan, herein referred to as the action plan, for the purpose of translating the framework into action plans at the local level."*

2. To provide a combination of control measures through the WQMA Action Plan to reduce pollution loads from point and non-point sources draining into a water body, so that it achieves its water quality objectives, or measures or actions to conserve its water quality.

3. To address the control of pollution sources and maintenance of water body use and water quality guidelines through the formulation of a WQMA Action Plan. In addition to the assurance of sound economical and environmental decision-making, the Action Plan is also intended:

   a) To serve as a tool to protect investments in pollution control programs.

   b) To assess the causes of existing as well as future water quality issues and concerns including sources of pollution identification.

   c) To determine the degree of implementation of management practices or strategies to reduce pollution and therefore shall effectively achieve water quality objectives or improvements. Specific inputs from public participation mechanisms shall be used to formulate the objectives, targets, and action plan.

4. To provide the LGU a guide on how to achieve the objectives of the WQMA Action Plan in its political jurisdiction through the preparation of the LGU Compliance Scheme for each designated WQMA.

5. To reflect the listing of activities and the schedule of compliance to meet the applicable requirements of the WQMA Action Plan through the preparation of the LGU Compliance Scheme for each designated WQMA.

SECTION III. DEFINITION OF TERMS

Beneficial use – means the use of the environment or any element or segment thereof conducive to public or private welfare, safety and health; and shall include, but not be limited to, to the use of water for domestic, municipal, irrigation, power generation, fisheries, livestock raising, industrial, recreational and other purposes.

1. *Use of water for domestic purposes* – means the utilization of water for drinking, washing, bathing, cooking or other household needs, home gardens and watering of lawns or domestic animals;

2. *Use of water for municipal purposes* – means the utilization of water for supplying water requirements of the community;

3. *Use of water for irrigation* – means the utilization of water for producing agricultural crops;

4. *Use of water for power generation* – means the utilization of water for producing electrical or mechanical power;

5. *Use of water for fisheries* – means the utilization of water for the propagation of culture of fish as a commercial enterprise;

6. *Use of water for livestock raising* – means the utilization of water for a large herd or flocks of animals raised as a commercial enterprise;

7. *Use of water for industrial purposes* – means the utilization of water in factories, industrial plants and mines, including the use of water as a raw material of a finished product; and

8. *Use of water for recreational purposes* – means the utilization of water for swimming pools, bath houses, boating, water skiing, golf courses and other similar facilities in resorts and other places of recreation.

Bureau – refers to the Environmental Management Bureau of the Department of Environment and Natural Resources (DENR).

Civil Society – means non-government organizations (NGOs) and people's organizations (POs).

Classification/Reclassification of Philippine Waters – means the categorization of all water bodies taking into account, among others, the following: (1) existing quality of the body of water; (2) size, depth, surface area covered, volume, direction, rate of flow and gradient of stream; (3) most beneficial existing and future use of said bodies of water and lands bordering them, such as for residential, agricultural, aquaculture, commercial, industrial, navigational, recreational, wildlife conservation and aesthetic purposes; and (4) vulnerability of surface and groundwater to contamination from pollutive and hazardous wastes, agricultural chemicals and underground storage tanks of petroleum products.

Clean-up operations – means activities involving the removal of pollutants discharged or spilled into a water body and its surrounding areas, and the rehabilitation of the affected areas to their former physical, chemical and biological state or conditions.

Commercial Wastewater – means all the wastewater generated by trading or business establishments and/or any other related firms or companies, which include but not limited to restaurants, shopping malls, commercial laboratories, hospitals, markets, commercial and residential condominiums, hotels, gasoline stations, and other establishments.

Contamination – means the introduction of substances not found in the natural composition of water that make the water less desirable or unfit for its intended use.

Department – means the DENR.

Discharge – includes, but not limited to, the act of spilling, leaking, pumping, pouring, emitting, emptying, releasing or dumping of any material into a water body or onto land from which it may flow or drain into said river.

Drinking water – means water intended for human consumption or for use in food preparation.

Dumping – means any unauthorized or illegal disposal into any body of water or land of wastes or toxic or hazardous material. Provided, that it does not mean a release of effluent coming from commercial, industrial, and domestic sources which are within the effluent standards.

Ecological Sanitation – or ECOSAN is an approach with the objective of closing the nutrient loop between sanitation and agriculture. It includes all of the following ecological principles: (1) conscious conservation of resources; (2) recycling and reuse; (3) minimization of energy and water use; (4) pollution prevention; and, (5) rendering the recyclables (human and animal excreta and grey water) safe for reuse.

Effluent – means discharges from known source which is passed into a body of water or land, or wastewater flowing out of the manufacturing plant, industrial plant including domestic, commercial and recreational facilities.

Effluent standard – means any legal restriction or limitation on quantities, rates, and/or concentrations or any combination thereof, of physical, chemical or biological parameters of effluent which a person or point source is allowed to discharge into a body of water or land.

Environmental Management – means the entire system which includes, but not limited to, conservation, regulation and minimization of pollution, clean production, waste management, environmental law and policy, environmental education and information, study and mitigation of the environmental impacts of human activity, and environmental research.

Environmental Management System – means the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

Freshwater – means water containing less than 500 ppm dissolved common salt, sodium chloride, such as that in groundwater, rivers, ponds and lakes.

Household Domestic Wastewater – means the waste water discharges generated from a household (single-residential structures), dwelling units specifically from toilets, kitchens, washing areas and other similar sanitary conveniences or facilities.

Industrial Wastewater – means all the wastewaters from any producing, manufacturing, processing, trade or business or any other operations/activities from industrial establishments.

Integrated Water Quality Management Framework – means the policy guideline integrating all the existing frameworks prepared by all government agencies on water quality involving pollution from all sources. Specifically, the framework shall contain the following: (a) water quality goals and targets; (b) period of compliance; (c) water pollution control strategies and techniques; (d) water quality information and education program; (e) human resources development program.

Loading Limit – refers to the allowable pollutant loading limit per unit of time which the discharger is permitted to discharge into any receiving body of water or land resources.

Loading Limit compliance – refers to the establishment or industry performances and practices in complying with the stipulated allowable pollutant loading and other permit conditions for waste water discharge.

National Water Quality Status Report – means a report to be prepared by the Department indicating: (a) the location of water bodies, their water quality, taking into account seasonal, tidal and other variations, existing and potential uses and sources of pollution per specific pollutant and pollution load assessment; (b) water quality management areas pursuant to Section 5 of this Act; and (c) water classification.

New sources of pollution – includes existing sources that have expanded or modified their production processes resulting in an increase in pollution load.

Non-point source – means any source of pollution not identifiable as point source to include, but not limited to, runoff from irrigation or rainwater which picks up pollutants from farms and urban areas.

Point source – means any identifiable source of pollution with specific point of discharge into a particular water body.

Pollutant – shall refer to any substance, whether solid, liquid, gaseous or radioactive, which directly or indirectly:

i. alters the quality of any segment of the receiving water body so as to affect or tend to affect adversely any beneficial use thereof;

ii. is hazardous or potentially hazardous to health;

iii. imparts objectionable odor, temperature change, or physical, chemical or biological change to any segment of the water body; or

iv. is in excess of the allowable limits or concentrations or quality standards specified, or in contravention of the condition, limitation or restriction prescribed in this Act.

Pollution control technology – means pollution control devices or apparatus, processes, or other means that effectively prevent, control or reduce pollution or water caused by effluents and other discharges, from any point source at levels within the water pollution standards.

Pre-Treatment Standards – standards issued by the Bureau, upon recommendation of the WTP operator/water district concessionaire, for treatment of wastewater prior to discharge into the sewerage system operated by the concerned WTP operator/water district or concessionaire.

Sanitation facilities – refers to on-site facilities such as toilets and septic tanks for safe disposal of human waste.

Secretary – means the Secretary of the DENR.

Septage – means the sludge produced from individual onsite wastewater-disposal systems, principally septic tanks and cesspools.

Sewage – means water-borne human or animal wastes, excluding oil or oil wastes, removed from residences, buildings, institutions, industrial and commercial establishments together with such groundwater, surface water and storm water as may be present including such waste from vessels, offshore structures, other receptacles intended to receive or retain wastes, or other places or the combination thereof.

Sewerage – includes, but is not limited to, any system or network of pipelines, ditches, channels, or conduits including pumping stations, lift stations and force mains, service connections including other constructions, devices and appliances appurtenant thereto, which involve the collection, transport, pumping and treatment of sewage to a point of disposal.

Specific point of discharge – refers to any discharges coming from a discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft.

Total pollution load – refers to the summation of the pollution load from all point and non-point sources, including natural sources.

Treatment – means any method, technique, or process designed to alter the physical, chemical or biological and radiological character or composition of any waste or wastewater to reduce or prevent pollution.

Toxic amount – means the lowest amount of concentration of toxic pollutants which may cause chronic or long-term acute or lethal conditions or effects to the aquatic life or health of persons or which may adversely affect designated water uses.

Watershed – a land area drained by a stream or fixed body of water and its tributaries having a common outlet for surface run-off.

Water Body – means both natural and man-made bodies of fresh, brackish, and saline waters, and includes, but not limited to, aquifers, groundwater, springs, creeks, streams, rivers, ponds, lagoons, water reservoirs, lakes, bays, estuarine, coastal and marine waters. Water bodies do not refer to those constructed, developed and used purposely as water treatment facilities and/or water storage for recycling and re-use which are integral to process industry or manufacturing.

Water pollution – means any alteration of the physical, chemical or biological or radiological properties of a water body resulting in the impairment of its purity or quality.

Water quality – means the characteristics of water which define its use in terms of physical, chemical, biological, bacteriological or radiological characteristics by which the acceptability of water is evaluated.

Water quality guidelines – means the level for a water constituent or numerical values of physical, chemical, biological and bacteriological or radiological parameters which are used to classify water resources and their use, which does not result in significant health risk and which are not intended for direct enforcement but only for water quality management purposes, such as determining time trends, evaluating stages of deterioration or enhancement of the water quality, and as basis for taking positive action in preventing, controlling or abating water pollution.

WQMA Action Plan – includes, but not limited to, the following: (a) goals and targets including sewerage or septage program; (b) schedule of compliance to meet the applicable requirements of this Act; (c) water pollution control strategies or techniques; (d) water quality information and education program; (e) resource requirement and possible sources; (f) enforcement procedures of the plan; and (g) rewards and incentives under Chapter 4 of this Act.

SECTION IV. PROCEDURE

A. Planning Approach

The planning approach for the WQMA Action Plan is based on the objectives and strategies as spelled out in the CWA and its IRR as well as other policies relevant to water quality management, specifically the national IWQMF. It is also guided by the

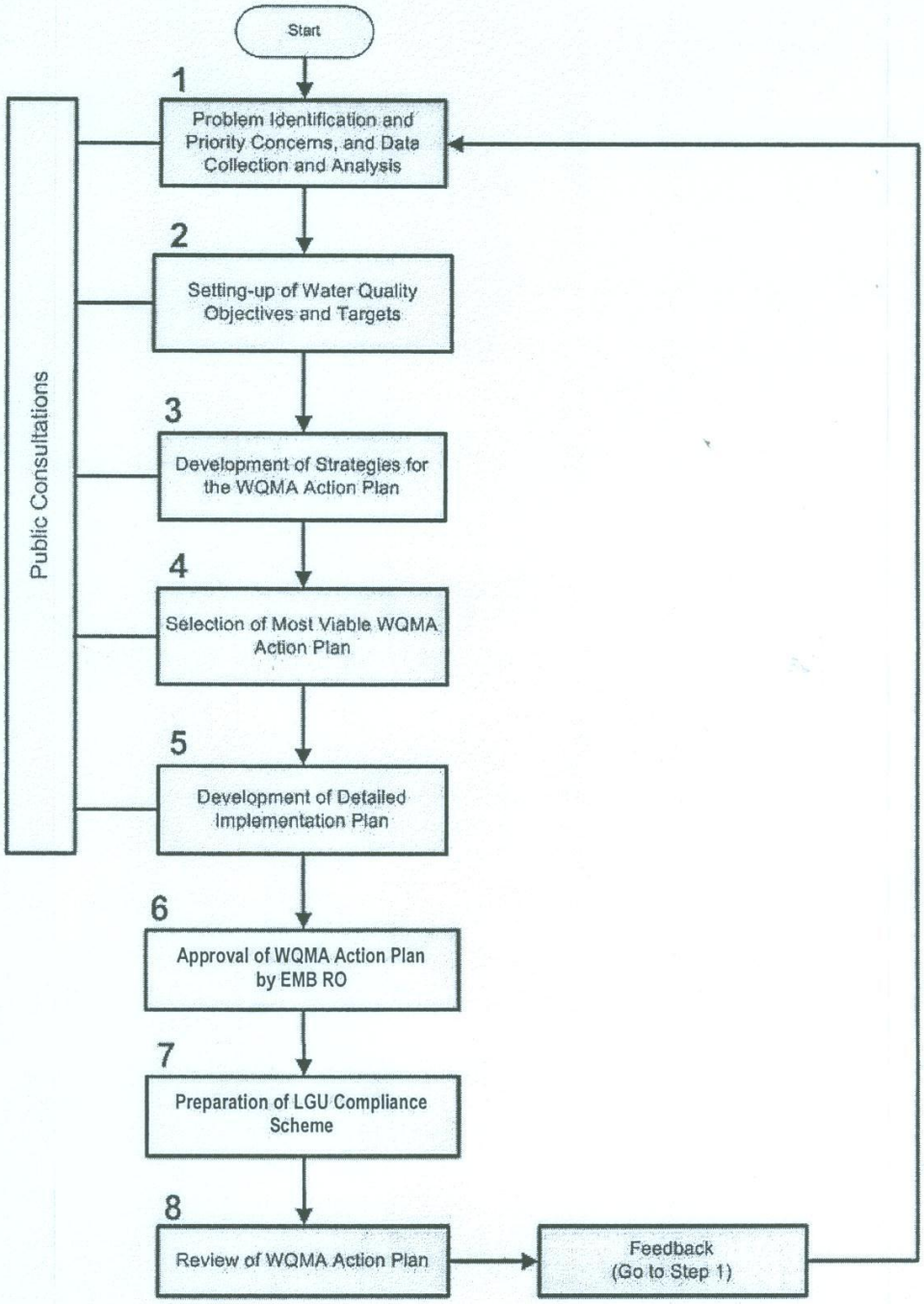
IWRM Plan for the area as well as a strong partnership between the various local stakeholders to set priorities and decisions.

The DENR/EMB RO will initiate the preparation of the initial WQMA Action Plan in coordination with National Water Resources Board (NWRB), members of LGUs, and other concerned sectors. Henceforth, the GB shall prepare the draft Action Plan that will be presented in a public consultation with the stakeholders.

Direct participation and involvement of the stakeholders and partners in formulating the Action Plan will provide an open and cooperative process to achieve mutually beneficial results that can lead to better use of the WQMA resources.

A phased implementation of the strategies/activities or actions will be undertaken to cover an intermediate planning period which is five (5) years, and the long-term period of ten (10) years.

In the planning process, the focus is on specific aspects in an iterative manner. The formulation of the Action Plan is dynamic and during implementation, it shall be evaluated to determine the success to support continued implementation. The activities shall be continuously monitored to ascertain if these are efficient and effective in addressing the problems. The planning cycle has to be repeated once the activities being implemented prove to be ineffective in achieving the objectives and targets of the WQMA. Figure 2.1 presents the process for WQMA Action Planning.



Process for WQMA Action Planning

B. The Consultation Process in WQMA Action Planning

A high quality participatory framework in water quality action planning will be adopted to allow for open participation of stakeholders in water quality management. Eight (8) steps have been identified for the development and review of the WQMA Action Plan. The first five (5) steps involve a great deal of public consultations and other participatory activities such as focus group discussions and committee meetings.

Public consultations in WQMA action planning shall bring together the stakeholders during the WQMA designation and enlist their involvement in the decision–making process.

Stakeholders will provide invaluable inputs by identifying perceived water quality concerns and issues that affect them, and in general, the people's perception about the natural environment. The probable impacts to public health and the environment of the current water quality concerns as well as of the activities that will be affected as a result of the management and regulatory actions will also be taken up.

Sorting of concerns can be classified based on the degree of priority:

(a) Poses a clear and present danger to environment and public health;

(b) Has a significant impact on the beneficial uses of the water body; and

(c) Marginal or uncertain water quality and ecosystem impacts.

The stakeholders will review and provide comments on the compiled environmental information gathered in (a). Water quality concerns will be sorted based on the level of impairment that the concern is considered to pose. The sorting is the first step in the consensus-building process. By sorting the concerns, the stakeholders will begin to develop a common understanding of issues to be addressed and will be better able to select which issues to target as referred to in (b).

From the results of (a), stakeholders will help the GB formulate the objectives and targets for the identified water quality concerns. This will ensure that the objectives and targets are consistent with the stakeholder consensus.

In developing objectives and targets, the benchmarks for assessing the existing condition (baseline) and the interventions/initiatives/success (objectives) shall be clearly defined. The objectives shall be specific, measurable, achievable and time-bound. The stakeholder shall therefore specify numerical targets, time table, and area covered in order to rehabilitate, restore or conserve the water body.

Targeted concerns shall be further considered during the development of water quality management strategies/activities in (c). Target setting shall take into consideration limited resources to achieve the best environmental results.

Consultations shall also be conducted to disclose the outcome of the WQMA Action Plan. This shall provide more opportunities for the various stakeholders to interact and have a meaningful exchange of information and sharing of perception, views and concerns regarding the proposed Action Plan and its probable effects. The primary aim of these activities is to share the visions for the improvement of water quality and management mechanism.

C. Process for WQMA Action Planning

1. Problem Identification and Priority Concerns, and Data Collection and Analysis

a. *Problem Identification and Priority Concerns*

Water quality problems are established by first determining present and future (desired) water uses for the WQMA, then determining if the present water quality would necessitate interventions to ensure the water uses. A water quality problem is apparent if there is need for intervention, whether at present or in the future.

It may be useful to be more specific in listing the water uses. For example, instead of a general water use of irrigation, it will be advantageous to clarify the range of crops to be irrigated, and the method of irrigation. Where there are edible parts of vegetables exposed to irrigation water, fecal coliform count shall be very small.

Water quality problems or impairments (causes and effects) shall be listed, and clearly characterized (refer to Annex A). For example, it is better to state that a beach resort has been closed down in several instances due to high coliform counts, rather than simply saying there is increased pollution coming from domestic sewage.

The severity of each of the listed problems shall also be evaluated to provide the basis for prioritizing management strategies.

The stakeholders' review of the environmental data as well as their perceived problems of marginal or uncertain water quality and ecosystem impacts shall be discussed to come up with a priority list of concerns. This step requires difficult choices and compromises by all stakeholders, because resources may not be sufficient to address all water concerns that will be identified.

b. *Data Collection and Analysis*

In addition to information gathered in the designation of the WQMA, the following data shall be collected for the WQMA action planning:

(1) Pollution Sources: primary and secondary data that can be evaluated to estimate pollution loads coming from both point and non-point sources. These will include effluent data monitoring reports from EMB, municipal and barangay population, manufacturing and agricultural outputs, water consumption data, and others.

(2) Land Use: data can be used to create a spatial assessment of the pollution sources, and evaluate the dynamics of run-off of pollutants, particularly from non-point sources.

(3) Biological systems: mapping of habitat areas, particularly for plants and animals affected by water quality.

(4) Natural and Man-made Water Drainage Channels/Conduits: data shall be evaluated to further evaluate pollutant transport within the WQMA.

(5) Sewage Treatment Plants (STPs), sewerage and sanitation systems: data shall be used to evaluate level of pollution reduction from end-of-pipe systems and assess potential for developing future systems.

(6) Proposed Programs and Projects: programs and projects with an impact on water quality shall be implemented. These shall be considered in all alternative action plans, unless evaluation of alternatives/strategies that shows both possible and advantageous not to proceed with a proposed program or project.

(7) Water quality, targets and programs of adjoining water bodies/WQMAs: It is vital to consider water bodies outside of the WQMA which influence or impact the water quality within the WQMA. Conflicts or disagreements between jurisdictions will arise, and there may be a need to make some assumptions on the impacts of the adjoining water bodies/WQMAs.

These data shall be mapped out and the maps produced shall allow the users to see the overall pattern as well as the detailed information which can be extracted by over-laying these maps in various combinations. By over-laying overall composite maps with various element maps, one can obtain more stratified information about a particular area in terms of water quality management.

Considering that the timeframes for the WQMA action plans are 5-year and 10-year periods, data collected shall include projections, if any, on how specific data will move in the future.

2. Setting-up of Water Quality Objectives and Targets

The quality of Philippine Waters shall be maintained in a safe and satisfactory condition according to their best usages. For this purpose, all waters shall be classified according to their best usages. Based mainly on the classification of the water bodies within the WQMA, and guided by the IWQM Framework as well as the stakeholder's input including prioritization of the marginal or uncertain water quality and ecosystem impacts, the water quality objectives for 5-year and 10-year timeframes shall be defined. Water quality objectives can be defined and related to water uses such as: public water supply; recreation and tourism; fish and wildlife sanctuary, fisheries; agriculture; industrial water; mining; and navigation.

Objectives shall be clearly defined and prioritized according to what shall be addressed immediately. The main objective of designating a water quality management area is to

protect the water body and its tributaries by keeping their water quality within the water quality criteria/guidelines, conforming to the water body's classification or even improve the quality to a higher classification. Thus, the water body must meet the water quality criteria/guidelines for which it has been classified. Moreover, a timetable for accomplishing each objective shall be set. In this regard, at the least, it shall be decided whether the objective will be accomplished at the end of the 10-year plan period, or intermediately, after 5 years. The following matrix is a guide to setting the action plan objectives:

General Water Use	Specific Water Use	Level of Priority*	Numerical WQ Objective	Timetable (5 or 10 years)	Boundary
Example: Agriculture	Irrigation for Vegetables and Seed Crops	High	Fecal Coliform: 100 MPN/100ml Geometric mean for a 3-month period during dry weather, limit should not be exceeded in more than 20% of the samples taken during the same period	5 years	Along River A, from confluence of River B and River A up to X kilometer downstream

A set of action plan strategies/activities may show that the initial objectives may not be attainable, given certain constraints, within the 5-year planning horizon. On the other hand, it may be found out that the initial water quality objectives may be moderate. It may therefore be necessary to modify, to a reasonable extent, the WQMA water quality objectives. **Annex A** provides a guide in defining problems and water quality objectives.

3. Development of Strategies for the WQMA Action Plans

Relating to the water quality objectives, the following shall be considered in drawing up the strategies for the WQMA Action Plans:

(1) Accomplish Agency Mandates, Policies and Priorities: Mandates assigned by legislation as well as the agency's policies and priorities shall first be addressed (e.g., CWA, Sanitation Code of the Philippines).

(2) Level of Stakeholder Support: This involves assessing the degree of public interest, and support by other agencies that are implementing water quality management measures such as the Department of Health (DOH), Department of Public Works and Highways (DPWH), Department of Agriculture (DA), Mines and Geo-sciences Bureau (MGB). This will be a qualitative assessment using categories as high, medium, or low.

(3) Resource Availability: Availability of funds for specific purposes shall be considered, since a fixed amount of resources may need to be allocated for different program-specific areas, (e.g., point source versus non-point source). Actions/activities may also be limited by personnel and operation resources.

(4) Manageability: This includes factors such as the feasibility of mitigating water quality problems, cost involved, time necessary to correct problems, as well as the willingness of agencies, LGUs and stakeholders to work together.

The strategies will be compared in terms of manageability of to come up with the most viable WQMA Action Plan.

a. *Strategies*

The core strategies which will comprise the action plans will be drawn up. Strategies may include but not be limited to the following:

(1) Point Sources Control Measures

Industrial Sources

- Effluent standards (general and industry-specific)
- Clean technologies
- Recovery, Recycle and Reuse of valuable materials, chemical substances

Municipal Sources

- Community sewerage systems
- Sanitation systems
- Septage collection and treatment
- Ecological Sanitation (ECOSAN) and Decentralized Wastewater System (DEWATS)

(2) Non-Point Sources Control Measures

- Stormwater management
- Measures to control increased run-off
- Agriculture
- Mining

(3) Others

- Prioritization of major pollution sources and zones (high impact areas)
- Land use planning and zoning
- Utilization of natural purification
- Relocation of pollution sources

An example of a set of measures for the control of sedimentation from non-point sources (urban run-off) is as follows:

- Structural measures – implementation of infrastructure or technologies (e.g., wastewater treatment plant, cleaner production, stormwater retention ponds, wetland development, dredging of sediments).
- Bioengineering measures – these are interventions using different live plants, either alone or in combination with other materials, organic or inorganic, to produce living, functioning systems for engineering applications and are commonly adapted agricultural practices to control non-point pollution and sedimentation.
- Best management practices – proven interventions, usually non-structural, and may require regulations (e.g., drip irrigation, integrated pest management, appropriate pesticide and herbicide application practices).

These strategies may set short-term countermeasures (5-year program) for pollution sources that need immediate actions and long-term (10-year) program.

It is also useful to draw-up a "do-nothing" scenario, which assumes a status quo for water quality management in the 10-year timeframe. Although there is a need to evaluate the effectivity (e.g., compliance) of present management measures in the future when both population and industry would have grown. This "do-nothing" scenario can be considered as a baseline plan and will be compared to new action plans.

b. *Development of Scenarios for the Pollution Reduction in WQMA Action Plan*

Based on the strategies, various scenarios for pollution reduction shall be developed. Focus shall be placed on the improvement of water quality to attain the water quality objectives of its classification. The pollution reduction plan will provide the basis for the effluent load allocation stipulated in the CWA.

The measures to ensure the required pollution load reduction shall be wide-ranging as presented in section 3.a. It is important to pursue the best combination of measures in order to make the pollution load reduction feasible, economical and effective.

c. *Investment Costs*

For each of these core activities, corresponding investment costs for both private and public investments shall be estimated. In addition, recurrent costs shall be estimated, and together with capital costs, present value costs of these activities can be estimated and compared.

One of the measures that can be applied to generate funds is through industrial pollution charges or the "polluter pays principle (PPP)" which the DENR has already adopted nationwide. Besides providing incentives to enterprises to reduce pollution, the revenues may also be used to support or fund activities.

d. *Preliminary Implementation Program*

A preliminary implementation program shall be prepared for each of the strategies which include the general implementation schedule, identification of responsible parties/implementing agencies and their individual roles, and the listing of requisites (e.g. local ordinances, information and education program). The implementation program shall allow the evaluator to see a complete view of the magnitude of each of the strategies.

4. Selection of Most Viable WQMA Action Plan

The most viable WQMA Action Plan shall be evaluated based on the criteria that compare specific water quality management strategies developed in this phase.

The criteria which may be considered are:

- Present value cost: Covering investments and recurring costs. Unit costs (e.g., the cost to remove one kg of BOD) can be derived to compare cost-effectiveness of specific strategies under each action plan.
- Social/Economic: What will be the direct impact on people's lives? What non-monetary benefits are expected?
- Environmental: What will be the impact of the action plan as compared to a do-nothing approach?
- Implementation Period: How long will it take to implement specific strategies?

Some criterion may be more important than others and weights shall be assigned to each criterion and inputted to the multi-attribute decision making methodology that is adopted. Lastly, under this stage, constraints shall also be listed to keep the development of strategies within realistic limits.

5. Development of Detailed Implementation Plan

The supporting activities for the selected strategies of the WQMA Action Plan shall be identified and further developed. This will involve drawing-up the details of the financing plan (including sources and cost-recovery strategies), listing of studies required, rewards and incentives, enforcement procedures, and the information and education program.

The financing plan shall cover not just the proposed projects but also support activities like succeeding public consultations, preparation of studies, pilot projects, and the information and education program.

All necessary studies leading to the implementation of specific strategies shall be identified. These may include feasibility studies, institutional building studies, environmental studies, and detailed engineering studies.

Rewards and incentives that promote the implementation of certain strategies shall be identified and options drawn-up on how the rewards and incentives shall be set-up,

operationalized, and sustained. In relation to this, DENR Administrative Order No. 17, series of 2013 was issued as the Guidelines for DENR Endorsement of Water Quality Management Projects under RA 9275.

Enforcement procedures will include recommendations on new ordinances, efficient monitoring programs, and more effective self-monitoring programs. The Ambient Water and Effluent Quality Monitoring Manuals issued as EMB Memorandum Circular No. 008, series of 2008 shall be used for this purpose.

The information and education program aims to make the industry, the local government, and the general public more informed of water quality issues. This is hoped, in the long term, to entice them to accept and pay for the cost of WQMA strategies proposed under the WQMA Action Plan.

Finally, in the detailed implementation plan, the schedule for all activities shall be drawn-up. Inter-relationships among activities shall also be identified and critical activities highlighted.

6. Approval of WQMA Action Plan by EMB RO

The WQMA Action Plan prepared by the GB shall be submitted to DENR through the EMB RO for approval to ensure consistency with the IWQMF.

7. Preparation of LGU Compliance Scheme

A compliance scheme shall be drawn-up by the concerned LGU and this will include the activities and timetable for achieving the objectives of the WQMA action plan in its jurisdiction. This is also to ensure consistency with existing mandates and complementation with compliance schemes of contiguous LGUs.

8. Review of WQMA Action Plan

The WQMA Action Plan shall be reviewed by the WQMA GB every five (5) years or as the need arises as stated in Section 19 of the CWA. The review may be undertaken when there is a potential release of pollutants to the receiving water body. The Plan shall be amended as appropriate. Any such changes shall be consistent with the objectives and requirements of WQMA designation.

The WQMA Action Plan shall be subject to modification to incorporate the revised/updated requirements, if at any time it proves to be ineffective in achieving the general objective of preventing and minimizing the generation of pollutants and their release and potential release to the receiving water body.

SECTION V. THE LGU COMPLIANCE SCHEME

A. Preparation of the LGU Compliance Scheme

Section 20 of the CWA stipulates that LGUs "*shall share the responsibility in the management and improvement of water quality within their territorial jurisdictions*" and as such they are mandated to prepare a compliance scheme within six (6) months after the establishment of the WQMA action plan of which shall be subject to review and approval by the GB.

In order to make the responsibility of LGUs distinct from that of the Technical Working Group (TWG), Sec. 20 specifically cites further, that each LGU "shall have the following powers and functions:

1. Monitoring of water quality
2. Emergency response
3. Compliance with the framework of the WQMA Action Plan
4. Take active participation in all the efforts concerning water quality protection and rehabilitation
5. Coordinate with other government agencies and civil society and concerned sectors in the implementation of measures to prevent and control water pollution."

With the above cited powers and functions, the LGU has the option to develop its own procedures concerning the preparation of its compliance scheme with the WQMA Action Plan. The compliance scheme developed shall be subject to review and approval of the GB. The following, however, are guides that the LGU may adopt concerning the preparation of its compliance scheme:

a. Preparation of a resolution adopting the DENR designation of WQMA;

b. Preparation of a resolution adopting the WQMA Action Plan;

c. Designation of the City/Municipal Environment and Natural Resources Officer (MENRO) and the City/ Municipal Planning Development Officer (MPDO) (also referred to as the Officers) to represent the LGU as members of the TWG;

d. Initiation of activities by the Officers in close coordination with the TWG as assisted by EMB RO, specifically the conduct of information campaign relative to the implementation of the WQMA Action Plan;

e. Provision of technical, administrative and political support to the TWG in the implementation of priorities cited in the WQMA Action Plan. The following are activities that may be provided to support the TWG:

B. Roles of Technical Secretariat in WQMA Action Plans

The Technical Secretariat of the WQMA shall be based in the DENR thru the EMB RO. Membership shall be designated by the EMB RO. The EMB RO shall designate the qualified personnel to serve in the Secretariat of the contiguous WQMA.

It is necessary to define the roles of the Technical Secretariat in order to differentiate the roles of the LGUs and multi-sector groups when it comes to water quality management in the designated WQMA. Specifically, these roles are to:

1. Serve primarily as secretariat to the GB by undertaking all activities and logistic requirements within the jurisdiction of the GB.
2. Initiate coordination activities between and among stakeholders within the jurisdiction of the identified LGU in support to the major tasks and duties of the GB.
3. Determine completeness of stakeholders in close coordination with the Office of the Mayor by preparing a master list of representatives of each interest group/stakeholder.
4. Conduct briefing/orientation on the WQMA Action Plan to all stakeholders.
5. Organize the stakeholders into a TWG/Multi-Sector Committee.
6. Conduct assessment on the training needs of members of the TWG Committee.
7. Prepare training design and conduct training in close coordination with the TWG.
8. Document all activities undertaken and prepare reports with recommendations to the GB for action/decision.
9. Arrange schedule for the conduct of study sessions on reports/issues presented/submitted by the TWG for the GB.
10. Prepare Resolutions on the decision of the GB for information and dissemination.
11. Perform other tasks assigned by the GB.

C. Steps for Coordinating Various Types of Action Planning Participants

Coordinating the multi-sector groups must be established in order for the EMB ROs to adopt a standard approach and strategy each time there is a need for coordination efforts involving the participation of LGUs and stakeholders in WQMA activities.

With varied interests, it cannot be avoided that conflicts on the use of the resource may arise. The following steps shall be observed in coordinating various groups for planning purposes:

1. Identify different types of stakeholders based on the beneficial use of the water resource. Below are the stakeholders that may be involved in the water quality management:

    - Civil Society comprising of non-government organizations and peoples' organizations who need water for domestic purposes – the utilization of water for drinking, bathing, washing, cleaning, watering of plants, lawns and domestic animals and other household needs. This group may have varied approaches according to their interest purpose, such as advocacy, education and information campaign, among others.

    - Local Government Units that need water for municipal purposes – such as supplying water requirements of the community.

    - Farmers who need water for irrigation purposes – for producing agricultural crops.

    - Power concessionaires who need water for producing electrical or mechanical power for power generation.

    - Fishermen who need water for the propagation of culture of fish as a commercial enterprise.

    - Livestock raisers who need water for poultry and livestock production – for large herds or flocks of animals being raised as a commercial enterprise.

    - Private companies and/or corporations that need water for industrial purposes – in factories, industrial plants, mines including use of water as an ingredient of a finished product.

    - Other special groups that need water for recreational purposes – such as water for swimming pools, bath houses, boating, water skiing, golf courses, and other similar facilities and places of recreation.

2. EMB RO categorizes the stakeholders according to their current usage of the water resource.

3. Upon completion of the list, EMB RO invites the various stakeholders to a meeting in coordination with the concerned LGU (Office of the Mayor). The EMB RO shall inform the stakeholders that the purpose of the meeting is to organize the TWG Multi-Stakeholder Committee .

4. Conducts a meeting to form and organize the stakeholders into a TWG/Multi-Sector Committee. Said meeting shall be completely documented.

5. EMB RO sets another meeting to formalize the organization of the TWG, during which the Chairman or Team Leader shall be selected.

SECTION VI. TECHNICAL OUTLINE OF THE WQMA ACTION PLAN

The WQMA Action Plan shall include the following components, as appropriate:

1. Statement of the Problem

    a. Describe the water quality problem identified through monitoring or other methods, including a summary of the analytical data.

    b. Describe the pollutant associated with this water quality problem, (e.g., a) low dissolved oxygen in discharge may be caused by too much organic material; b) pesticides may be washed into water or carried into soil which moves into water, even if it has not been recently applied; c) salts in discharge may come from natural groundwater sources or upstream waste discharge; and d) nitrogen or ammonia may be added to discharge by fertilizer not consumed by the plant, crop waste, or upstream waste discharge). If the cause of the water quality problem is not identified, select a method to determine the cause and timeline to get this information.

    c. Describe the sources of the pollutant or water quality problem and the amount of pollutant added from that source, if known. If the source of the pollutant is not known, describe a method to identify the source and timeline to get this information.

2. Identification of Objectives and Targets

This Section shows how the stakeholders prioritized the objectives to address the issue of how priority concerns were targeted for management actions.

3. Planning Approach and Methodology

This will involve a discussion on the planning processes adopted, (i.e the "participatory approach").

4. Identification of Management Measures and Actions to Address Site Specific Issues/Concerns

    a. Describe the existing management methods in place to control this pollutant, specify the area, date of installation, documentation, and the source of the technical reference on the effectiveness of the method.

b. Describe the proposed management methods/strategies to control this pollutant and providing timeline for the installation/implementation and the anticipated reduction in the amount of the pollutant, if known.

c. Describe the factors influencing the exceedance of the water quality objectives, including the timing, amount and point of discharge.

d. Describe the methods for determining the impact of the proposed management method/strategy including inspection, sampling, water quality monitoring with timeline and/or modelling.

e. Provide the technical documentation that the management method/strategies will result in a change of water quality

f. Provide a schedule for implementation and revision of management practices, including monitoring to evaluate effectiveness of management practices/ strategies.

5. Recommended WQMA Action Plan

Include a matrix that shows the following elements: prioritized recommendations, phasing (intermediate-5 years; long term-10 years), agency/lead organization responsible, problems being addressed, benefits to be expected, estimated costs, permits needed, and other implementation issues.

6. Compliance Monitoring Plan

Include the objectives of the monitoring program, monitoring parameters (baseline data/success criteria, monitoring methods, locations, schedule, lead agency and costs), data management and reporting, management of the monitoring program and application of monitoring data for improvement of management measures and recommended actions.