# NATIONAL WATER RESOURCE INFRASTRUCTURE (NWRI)

# Resource Management Plan Review INJAKA DAM

REPORT – Volume 1 of 2 December 2016



WATER IS LIFE - SANITATION IS DIGNITY



# water & sanitation

Department: Water and Sanitation REPUBLIC OF SOUTH AFRICA



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- Bushbuckridge Local Municipality;
- Department of Environmental Affairs: Working for Water;
- Department of Public Works: National and provincial;
- Department of Transport;
- Department of Water and Sanitation;
- Ehlanzeni District Municipality;
- Inkomati-Usuthu Catchment Management Agency;
- Kgarudi Tribal Authority;
- Mathibela Tribal Authority;
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- Mpumalanga Tourism and Parks Agency;
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- South African Maritime Safety Authority;
- Thabakgolo Tribal Authority; and
- The community members of Bushbuckridge.

Acknowledgement is also extended to all Stakeholders who attended and participated in the Stakeholder engagements.

# TITLE AND APPROVAL PAGE

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#### **Review:**

Review Period	Month	Year				
Annual Review of Business Plan	December	2018 <sup>1</sup>	2019	2020	2021	2022
Five (5) Yearly Review of RMP	December	2022				

<sup>&</sup>lt;sup>1</sup> The implementation of the RMP and BP requires a year budget planning prior to operationalisation.

AMEN	DMENTS	PAGE
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Revision No	Description	Date
1	Draft RMP Review for DWS Review	02/12/2015
2	Draft RMP Review for DWS Review	20/06/2016
3	Draft RMP Review for DWS Review	31/08/2016
4	Final RMP Review for DWS Approval	30/11/2016
5	Final RMP Review for DWS Approval	14/12/2016

# LIST OF ACRONYMS

AtoN	Aid(s) to Navigation
BBBEE	Broad Based Black Economic Empowerment
BFI	Benefit Flow Institution
BID	Background Information Document
BLM	Bushbuckridge Local Municipality
BP	Business Plan
CATHSSETA	Culture, Arts, Tourism, Hospitality, Sports Sector, Education and Training Authority
CD: IO MANCO	Chief Director: Infrastructure Operations Management Committee
CIWSP	Cooperative Inland Waterways Safety Programme
CMA	Catchment Management Area
COGTA	Department of Cooperative Governance and Traditional Affairs
CPAs	Community Property Associations
CPSI	Centre for Public Service Innovation
CRDP	Comprehensive Rural Development Programme
DAFF	Department of Agriculture, Forestry and Fisheries
DARDLEA	Department of Agriculture, Rural Development and Land Administration and
	Environmental Affairs
DEA	Department of Environmental Affairs
DEDET	Department of Economic Development, Environment and Tourism
DHS	Department of Human Settlement
DMC	Dam Management Committee
DoF	Department of Finance
DoT	Department of Transport
DPW	Department of Public Works
DRDLR	Department of Rural Development and Land Reform
DSR	Department Sports and Recreation
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECC	Effective Carrying Capacity
EDM	Ehlanzeni District Municipality
EMF	Environmental Management Framework
FP	Financial Plan
FSL	Full Supply Level
GDP	Gross Domestic Product
GIAMA	Government Immovable Assert Management Act
GPS	Global Positioning System
GWWS	Governmental Waterworks
	Interested and Affected Parties
IALA	Authorities
ICUMA	Inkomati-Usuthu Catchment Management Agency
IDP	Integrated Development Plan
IEE	Integrated Environmental Engineering
IEMS	Integrated Environmental Management
IRMP	Integrated Resource Management Plan
KNP	Kruger National Park

КРА	Key Performance Area
LED	Local Economic Development
MC	Management Capacity
MEGA	Mpumalanga Economic Growth Agency
MOA	Memorandum of Agreement
NDT	National Department of Transport
NEMA	National Environmental Management Act
NEMPAA	National Environmental Management: Protected Areas Act
NPSC	National Project Steering Committee
NT	National Treasury
NWA	National Water Act
NWRI	National Water Resource Infrastructure
OMC	Operations Management Committee
PCC	Physical Carrying Capacity
PFMA	Public Finance Management Act
РР	Public Participation Process
РРР	Public Private Partnership
PSP	Professional Service Provider
RCC	Real Carrying Capacity
RF	Rotational Factor
RMP	Resource Management Plan
RW	Rand Water
SAMSA	South African Maritime Safety Authority
SAPS	South African Police Services
SASCOC	South African Sports Confederation and Olympic Committee
SDF	Spatial Development Framework
SWOT	Strengths, Weaknesses, Opportunities and Threats
ТР	Tourism Potential
WfW	Working for Water
WMA	Water Management Area
WUA	Water Use Association

### **EXECUTIVE SUMMARY**

Mandate: The Department of Water and Sanitation (DWS), through the National Water Act, 1998 (Act No. 36 of 1998), is mandated to protect aquatic and associated ecosystems and their biological diversity. The Minister of Water and Sanitation, as the custodian of the nation's water resources must ensure that the Government Waterworks (GWWs), including Inyaka Dam, are protected, used, developed, managed and controlled in a sustainable manner, for the benefit of all. To assist the Minister in attaining the mandate, and to ensure that access to, and use of, the dam is the DWS initiated equitable, and commissioned the development of the Resource Management Plan (RMP) for Invaka Dam.

The existing RMP for Inyaka Dam was approved on **23 March 2007.** However, it was never implemented. On this note DWS has identified the need to review the RMP for Inyaka Dam.

**Purpose of the RMP Review:** The purpose of the RMP review is to ascertain its contribution to the attainment of the National Water Act, 1998 (Act No. 36 of 1998) objectives by ensuring effective engagement of communities affected and interested in the water resource and its utilisation, and also the engagement of industry key role players.

The RMP review also ensures that the plan is based not only on ecological principles but also on the needs and expectations of communities and the recreation industry.

According to DWAF (2006), RMP requires a five (5) year revision and an annual revision for the BP to ensure that management objectives remain relevant and management actions are continually improved.

**Location of the dam:** Injaka Dam is an Earth-fill type of dam which impounds Marite River. It falls under **Ward 9** within the jurisdiction of the Bushbuckridge Local Municipality (BLM) which forms part of the Ehlanzeni District

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Municipality (EDM) in the Mpumalanga Province, South Africa. Its GPS coordinates are: **24°53′04″S 31°05′05″E.** 

**Purpose of the dam:** The primary purpose of Injaka Dam is to provide raw water for irrigation, and domestic use.

Currently there are no recreational activities which are taking place at the dam, but only occasional subsistence fishing by local communities.

**Dam ownership and management:** The dam is owned and operated by Department of Water and Sanitation. There are no controlled access areas at the dam for recreational activities or use.

There is currently no institutional structure to manage the recreational use of the dam. However, the structure has been proposed in the RMP. The recreational institutional structure is necessary for the effective governance of the Inyaka Dam for recreational purposes.

**Stakeholder engagement:** The success of the development and implementation of the RMP depends on the role players and their level of participation. It is thus recognized that different roles and responsibilities of the stakeholders [Authorities and Interested and Affected Parties (I&APs)], their relationship towards each other and the steps in the planning procedure are imperative in the successful development of the RMP. As such, proper consultation with the public was done in order to help in producing a credible RMP.

DWAF's Guidelines for Public Participation (2001) outlines three (3) broad phases for public participation namely the **Planning**, **Participation** and **Exit phase**.

During the **Planning phase** a site inspection was conducted and literature reviewed in order to gather baseline information about the dam. A process was also established to get into contact with the I&APs and relevant authorities to ensure co-operative interests and support in the RMP project.

The **Participation phase** entailed three (3) important aspects, namely:

- Informing stakeholders about the RMP project;
- Meeting the stakeholders to present the RMP process; and
- Giving Feedback in the form of meeting minutes, follow-up emails, telephonic and direct communication.

During the **Exit phase**, a draft RMP was presented to the stakeholders for comment and inputs. The Exit phase entailed two (2) important aspects, namely:

- Ensuring that all goals, challenges, concerns, objectives and the vision of the dam are identified and documented in the RMP; and
- Officially ending the public participation process.

**Identified objectives and vision:** During the Authority and Public Meetings issues of concerns were raised from which common objectives were identified and a vision for the dam, for a period of 20 years, were formulated by the stakeholders.

Below is the list of objectives amongst others that were identified previously, during the development of the existing RMP and also the current identified objectives.

Previously Identified Objectives

- To improve the water quality of Injaka Dam;
- To keep the dam and the surrounding environment free of alien vegetation;
- To conserve the natural environment in and around the dam in a sustainable manner;
- To prevent net fishing as it depletes the fish species in the dam;
- To manage the water resource and the surrounding environment in a sustainable manner;

- To maintain and enhance the natural character of the dam and the surrounding environment and also to minimize impact thereof - the objective will be to allow for natural functioning of the aquatic and related eco-system with minimal interventions, however, programs for controlling alien invasive vegetation will be initiated;
- To determine sustainable carrying capacity for resource utilization and limit of acceptable change and to accordingly monitor utilization impacts;
- To provide sustainable utilization of the natural resources of Injaka Dam in a manner that optimizes income and other benefits without compromising the primary and secondary objectives;
- To research, document and protect the cultural resources within the area, with specific consideration to the paleontological, archaeological, historical and cultural heritage resources applied in the following descending order of priority: international, national, provincial and local;
- To document the history of the Injaka Dam, specifically the history of the farm and the valley;
- As part of the tourist experience, to provide insight into the establishment and purposes of the dam, and the cultural heritage resources associated with the area;
- The primary objective for land expansion and incorporation is to incorporate all land within the Injaka Dam sphere of influence under formal co-management agreement. Expansion will be considered if it enhances the natural resource management and business objectives of the dam by significantly enhancing the tourist experience available at Injaka Dam;
- To promote equitable access and use of the dam by the public;
- To address the needs of the public in an appropriate and equitable manner;

- To establish a swimming pool for the community to eliminate drowning incidents;
- To establish a spot for a golf course;
- To promote public safety when accessing the dam;
- To optimise tourism and economic development opportunities in an equitable manner based on the opportunities and constraints posed by the dam and surroundings;
- To formalise relationship with operators, ensuring that all activities are authorised in terms of relevant legislation;
- To ensure that private sector involvement is equitable and that market related fees are paid for the use of Injaka Dam;
- To address the needs of the public in an appropriate and equitable manner;
- To encourage outsourcing of public access facilities and to define operating and safety rules in co-operation with contractors and operators;
- To create awareness regarding these rules;
- To ensure that all infrastructural development enhance the sense of place of the dam, while complying with all environmental and related regulatory requirements;
- All infrastructural development must be planned to ensure that it is cost effective, appropriate and contributes to attaining the objectives of the dam;
- To control and limit infrastructural development through authorizations and conditions attached to agreements and contracts;
- To develop a unique branding for the dam that can be well marketed;
- To ensure consistency and accuracy regarding the content of marketing material and programs;
- Optimize economic and social benefits locally and for the region through the establishment awareness regarding the dam, its products, and programs;
- To improve the lives of the community through employment opportunities and skills development programs;

- To facilitate the establishment of a Benefit Flow Institution (BFI) or appropriate institutional arrangements consisting of representatives from neighbouring communities and selected external persons as a vehicle to oversee and distribute community benefits equitably and fairly;
- To illustrate the benefits accruing from sustainable management, utilisation and development;
- To stimulate local economic activities through training, capacitation and empowerment programmes; and

#### Current Identified Objectives

- To improve the water quality of Injaka Dam;
- To keep the dam and the surrounding environment free of alien vegetation;
- To conserve the natural environment in and around the dam in a sustainable manner;
- To prevent net fishing as it depletes the fish species in the dam; and
- To manage the water resource and the surrounding environment in a sustainable manner.
- To promote equitable access and use of the dam by the public;
- To address the needs of the public in an appropriate and equitable manner;
- To establish a swimming pool for the community to eliminate drowning incidents; and
- To establish a spot for a golf course.
- To improve the lives of the community through employment opportunities and skills development programs;
- To review the institutional structure which was formed in 2007; and
- To introduce commercial fishery at the dam.

A vision for the dam, for a period of 20 years, was formulated by stakeholders to be as follows:

"A commitment to unlock the potential of Injaka Dam in a sustainable manner, based on sound business, resource management, and environmental principles that benefit both the water user and affected communities in an equitable manner".

The aforementioned objectives and vision are aimed at supporting the attainment of DWS's vision, mission and objectives.

**Tourism Potential:** The following were identified as some of the potential recreational

developments at the Inyaka Dam that could enhance tourist attraction:

- Construction of swimming pools
- Establishment a golf course
- Establishment of a camping site.
- Provision of suitable recreational facilities such as braai areas and bank angling.

# **TABLE OF CONTENTS**

ACKNOWLEDGEMENTS ii			
TITLE AND APPROVAL PAGE iii			
AMENDMENTS PAGEiv			
LIST OF ACR	ONYMSv		
EXECUTIVE	SUMMARYvii		
CHAPTER 1:	INTRODUCTION		
1.1 BA	ACKGROUND OF INJAKA DAM1		
1.2 BI	O-PHYSICAL ENVIRONMENT		
1.2.1 Cli	mate3		
1.2.2 Flo	ora3		
1.2.3 Fa	una4		
1.2.4 To	pography4		
1.2.4 Ge	eology and Soils4		
1.2.6 Hy	/drology4		
1.3 BL	JILT ENVIRIONMENT9		
1.3.1 Tra	ansport networks9		
1.3.2 Pa	rks9		
1.3.3 Bu	ildings9		
1.3.4 Ma	aviljan Ponds (Waste Water)9		
1.4 US	SES AND USERS OF THE DAM		
1.4.1 Pri	imary Function9		
1.4.2 Se	condary Function9		
1.4.3 Ot	her Function9		
1.5 RE	ECREATIONAL INSTITUTIONAL STRUCTURE		
1.5.1 Ma	anagement of Water Surface9		
1.5.2 Ev	ent Management9		
1.6 LA	ND OWNERSHIP 10		
1.6.1 La	nd Claim10		
1.7 SA	AFETY		
1.7.1 Sat	fety of Navigation10		
1.8 SC	DCIO-ECONOMIC ENVIRONMENT 10		
1.8.1 Co	mmunity Beneficiation11		
CHAPTER: 2	LEGISLATIVE FRAMEWORK 12		
CHAPTER 3:	WHAT IS A RESOURCE MANAGEMENT PLAN 16		

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW

	3.1	DEFINITION OF RMP 1	6	
	3.2	PURPOSE OF THE RMP REVIEW1	6	
	3.3	PROCESS TRIGGERS 1	6	
	3.4	RMP REVIEW FRAMEWORK 1	7	
	3.5	RMP PLANNING STAGES 1	8	
	3.5.1	Desktop Study1	.8	
	3.5.2	Site Inspection1	.8	
	3.5.3	Public Participation1	.8	
	3.5.4	Planning Partners2	20	
	3.6	RMP DATA ANALYSIS 2	2	
	3.6.1	ncumbrance Survey (Phase 2)2	22	
	3.6.2	WOT Analysis and Objective Identification2	23	
С	HAPTE	CHAPTER 4: INTERGRATED MANAGEMENT, ZONING AND INSTITUTIONAL PLAN (PHASE 5)		
	4.1	INSTITUTION PLAN	0	
	4.1 4.1.1	INSTITUTION PLAN	0 80	
	4.1 4.1.1 4.1.2	INSTITUTION PLAN	0 0 3	
	4.1 4.1.1 4.1.2 4.1.3	INSTITUTION PLAN	0 0 3 3	
	4.1 4.1.1 4.1.2 4.1.3 4.2	INSTITUTION PLAN	60 60 60 70 70 70 70 70 70 70 70 70 70 70 70 70	
	4.1 4.1.1 4.1.2 4.1.3 4.2 4.2.1	INSTITUTION PLAN       3         Dam Management Committee (DMC)       3         Operations Management Committee (OMC)       3         National Project Steering Committee (NPSC)       3         ZONING PLAN       3         Water Surface Zoning       3	30 33 33 36 36	
	<ul> <li>4.1</li> <li>4.1.2</li> <li>4.1.3</li> <li>4.2</li> <li>4.2.1 \$</li> <li>4.2.2 \$</li> </ul>	INSTITUTION PLAN       3         Dam Management Committee (DMC)       3         Operations Management Committee (OMC)       3         National Project Steering Committee (NPSC)       3         ZONING PLAN       3         Water Surface Zoning       3         Shoreline Zoning       4	30 33 33 36 36 36	
	4.1 4.1.2 4.1.3 4.2 4.2.1 4.2.2 4.2.3	INSTITUTION PLAN       3         Dam Management Committee (DMC)       3         Operations Management Committee (OMC)       3         National Project Steering Committee (NPSC)       3         ZONING PLAN       3         Water Surface Zoning       3         Shoreline Zoning       4         Carrying Capacity       4	30 33 33 36 36 40	
	4.1 4.1.2 4.1.3 4.2 4.2.1 4.2.2 4.2.3 4.2.3 4.3	INSTITUTION PLAN       3         Dam Management Committee (DMC)       3         Operations Management Committee (OMC)       3         National Project Steering Committee (NPSC)       3         ZONING PLAN       3         Water Surface Zoning       3         Schoreline Zoning       4         STRATEGIC PLAN       4	30 33 33 36 36 40 4 5	
	4.1 4.1.2 4.1.3 4.2 4.2.1 4.2.2 4.2.3 4.2.3 4.2.3 4.2.3 4.2 4.2 4.2 4.2 4.2 4.2 4.2 4.3 4.4	INSTITUTION PLAN       3         Dam Management Committee (DMC)       3         Operations Management Committee (OMC)       3         National Project Steering Committee (NPSC)       3         ZONING PLAN       3         Vater Surface Zoning       3         Schoreline Zoning       4         Carrying Capacity       4         FINANCIAL PLAN       5		
v	4.1 4.1.1 4.1.2 4.1.3 4.2 4.2.1 4.2.2 4.2.3 4.2.3 4.2 4.2 4.2 5 4.2 5 4.2 5 4.2 5 4.2 5 4.2 5 4.2 5 4.2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	INSTITUTION PLAN	0 33 36 60 4 53 4	
v	4.1 4.1.1 4.1.2 4.1.3 4.2 4.2.1 4.2.2 4.2.3 4.2.3 4.3 4.4 VAY FO	INSTITUTION PLAN       3         Dam Management Committee (DMC)       3         Operations Management Committee (OMC)       3         National Project Steering Committee (NPSC)       3         ZONING PLAN       3         Water Surface Zoning       3         Shoreline Zoning       4         Carrying Capacity       4         FINANCIAL PLAN       5         SIONS       5		

# **LIST OF FIGURES**

Figure 1: Locality Map for Injaka Dam	2
Figure 2: Geology Map for Injaka Dam	5
Figure 3: Topography / Slope Map for Injaka Dam	6
Figure 4: Fluctuation of Water level in the Injaka Dam, 2015	7
Figure 5: Hydrological Map for Injaka Dam	8
Figure 6: Population Dynamics of Ward 9 versus BLM	11
Figure 6: RMP Review Framework	17
Figure 7: Integrated Resource Management Plan	29
Figure 8 : Proposed DMC	31
Figure 9: Existing CD: IO MANCO	33
Figure 10: Proposed NPSC	34
Figure 11: Proposed Surface Water Zoning Map	39
Figure 12: Proposed Shoreline Zoning Map	42
Figure 13: Proposed Overall Zoning Map	43
Figure 14: RMP and BP and Review Framework	54

# LIST OF TABLES

Table 1: Injaka Dam profile	1
Table 2: Water Quality for Injaka Dam (DWS: RQS, 2013)	7
Table 3: Education level of Ward 9 (2011)	11
Table 4: Household Income for BLM	11
Table 3: Trigger factors for Injaka Dam	16
Table 4: Planning Partners and their Respective Mandate	20
Table 5: Summary of Biophysical Encumbrances	22
Table 6: Summary of Legal Encumbrances	23
Table 7: Summary of Social Encumbrances	23
Table 8: SWOT Analysis for Injaka Dam	24
Table 9: Summary of Objectives identified in 2007	26
Table 10: Proposed Water Surface Zoning Description	38
Table 11: Proposed Shoreline Zoning Description	41
Table 12: Strategic Plan for KPA: 1: Resource Management (new)	46
Table 13: Strategic Plan for KPA: 2 Resource Utilisation (new)	47
Table 14: Strategic Plan for KPA 3: Benefit Flow Management (new)	49
Table 15: Strategic Plan for KPA 1: Resource Management (old)	49
Table 16: Strategic Plan for KPA 2: Resource Utilisation (old)	51
Table 17: Strategic Plan for KPA 3: Benefit Flow Management (old)	52

# LIST OF APPENDICES

- Appendix A : Stakeholder Database Register
- Appendix B : Background Information Document (BID)
- Appendix C : Newspaper Advert
- Appendix D : Flyers
- Appendix E : Emails
- Appendix F : Comments and Responses Register

# **CHAPTER 1: INTRODUCTION**

#### 1.1 BACKGROUND OF INJAKA DAM

Injaka Dam is an Earth-fill type of dam which impounds Marite River. It falls under **Ward 9** within the jurisdiction of the Bushbuckridge Local Municipality (BLM) which forms part of the Ehlanzeni District Municipality (EDM) in the Mpumalanga Province, South Africa. Its GPS coordinates are: **24°53′04″S; 31°05′05″E.** The dam is located approximately 25 km north of the town of Hazyview within Mpumalanga Province (See **Figure 1** for the Locality map). The dam was constructed in order to meet the high demand for water supply in Bushbuckridge Region.

Injaka Dam, forms part of the Sabie River Government Water Scheme, it comprises of a 53m high earth fill embankment with a central through spillway of mass and reinforced concrete. This layout and design was dictated by the fact that rock for the overspill structure was available at a shallow depth only in the riverbed (DWAF, 2000). The dam profile is summarised in **Table 2**.

Injaka Dam Profile		
Location	South Africa	
Province	Mpumalanga	
District Municipality	Ehlanzeni District Municipality	
Local Municipality	Bushbuckridge Local Municipality	
Nearest Town	Hazyview	
Completion Year	2001	
Coordinates	24°53′04″S 31°05′05″E	
Purpose	Irrigation and Domestic Use	
Owner	DWS	
Water Management Area	Inkomati-Usuthu WMA	
Quaternary Drainage Area	X31E	
Catchment Area (km <sup>2</sup> )	209	
River	Marite River	
Capacity (m <sup>3</sup> )	125 027 000	
Surface area (ha)	81.1	
Wall Type	Earth Fill	
Wall Height (m)	51	
Length (m)	550	

Table 1: Injaka Dam profile

Source: Department of Water Affairs (List of registered dams, 2013)



Figure 1: Locality Map for Injaka Dam

#### **1.2 BIO-PHYSICAL ENVIRONMENT**

#### 1.2.1 Climate

Injaka Dam falls in the summer rainfall region of South Africa. Generally it is a warm to hot, sub-tropical climate with periods of high flow and sporadic flooding during summer months and low flows during winter (Sudlow, 2004). The mean annual precipitation rate is 1 260 mm/year in the Injaka Dam area.

The evaporation rate is lowest in the west with 1 400 mm, but much higher in the east, rising to 1 700 mm. It is estimated that 80% of runoff is generated in the upper 20% of the Sabie River catchment. This also relates to the sediment production in the catchment which is highest in the region west of the Kruger National Park due to overgrazing and land degradation (Jewitt et al, 1997).

The average summer and winter temperatures are 26°C and 16°C respectively. A maximum average temperature of 34°C and a minimum average temperature of 15°C can be expected during summer. In winter the maximum average temperatures may rise to 29°C while minimum average temperature may drop to 4°C (Ackerman, 2000). The prevailing wind direction is north east during summer and south east during winter. A general wind speed of 12 km/hour can be expected (Ackerman, 2000).

#### 1.2.2 Flora

Low & Rebelo, 1996 classifies the veld type of the area around Injaka Dam as a Sour Lowveld Bushveld. However, most of the natural vegetation has been removed due to forestry practices. The only remaining portions that represent the natural vegetation of the region are located on small isolated patches, north of the dam near Maviljan and Bushbuckridge and a thin zone of riparian vegetation (Ackerman, 2000).

#### 1.2.2.1 Terrestrial Alien Invasive Vegetation

Alien invasive plant species are non-indigenous plants introduced from other countries. Once they were introduced, they tend to spread beyond the area where they are desired. Alien plant species also outcompete the indigenous species wherever they germinate.

Alien invasive species have been categorized in the following categories: NEMBA 2004 (Act No. 10 of 2004), Alien and Invasive Species Regulations, 2014:

- **Category 1a:** Invader plants species which must be combatted or eradicated.
- **Category 1b:** Invader plants species which must be controlled.
- **Category 2:** Invader plants species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.
- **Category 3:** Invader plants species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act.

The most common Terrestrial Alien Plants in South Africa are the Black Wattle (*Arcacia Mearnsii*), Mauritius Thorn (*Caesalpinia Decapetala*), Guava (*Psidium Guajava*), Castor Oil plant (*Ricinas Communis*), Blue Gum (*Eucalyptus globulus*), Pine Trees, Bug weed (*Solanum Mauritinum*), Port Jackson willow (*Acacia Saligna*), weeping willow (*Salix Babylonica*), Tickberry (*Lantana camara*, blackwood (*Dalbergia melanoxylon*) and the silver wattle (*Acacia dealbata*).

Large areas around the dam are planted with Blue gum and Pine, with abandoned Coffee plantations (Ackerman, 2000). It was estimated that 69 000 ha of the Sabie River catchment was replaced with exotic afforestation in 1972. Since then a permit controlled additional system exotic afforestation to a moderate increase in the catchment (Sudlow, 2004). The riparian zones of rivers and water bodies are particularly vulnerable to invasion by alien vegetation.

Some exotic invaders have become a concern along the Sabie River riparian zone and have probably spread into the tributaries. In particular *Lantana camara* and to a lesser degree *Melia azedarach*. Higher up in the catchment outside the borders of the Kruger National Park many *Pinus* and *Eucalyptus* species occur as a result of commercial forestry (Mackenzie et al., 1996).

#### 1.2.2.2 Aquatic Weeds

There are ten known aquatic weeds in South Africa. The known weeds include, among others, the Water Hyacinth (Eichhornia crassipes), Red water fern (Azolla filiculoides), Parrots feather (Myriophyllum aquaticum), Water lettuce (Pistia Stratoites), etc. During the research on the RMP process, no aquatic alien species were identified at Injaka Dam.

There are different methods to control alien aquatic weeds at the dam which include:

- **Mechanical control** is the mowing or mechanical cutting of an invasive plant infestation to limit seed production.
- Manual invasive plant control is handpulling or digging of the aquatic weeds.
- **Biological control** often works best on large infestations, or infestations that are near the water.

The establishment of wash bays in dams where there are no alien aquatic weeds will prevent the introduction of these weeds into the dam from other dam.

#### 1.2.3 Fauna

It is expected that the presence of game reserve will be limited to low numbers of small mammals due to the extensive forestry practices in the region and a lack of connectivity to more natural and/or conserved areas (Ackerman, 2000).

There are hippopotamuses and crocodiles in the water resource and these wild life will soon dominate the water resource. The aquatic bird diversity and numbers will increase as a result of the presence of a permanent water source. This can be enhanced and it is expected that the occurrence of terrestrial birds will recover through the planting of indigenous vegetation on the banks as proposed by Ackerman (2000).

The occurrence of reptiles and amphibians will probably increase if suitable habitats are

established on the banks. The presence of Injaka Dam will alter the populations and species composition of fish in the system. A potential population explosion may occur which can be of great benefit to the surrounding communities (Ackerman, 2000).

#### 1.2.4 Topography

Injaka Dam is situated in the transition zone between the Drakensberg Mountains and the Lowveld. The western portion of the Sabie River catchment is mountainous, panning out into a low lying plain to the east (See **Figure 3** for Topographic Map). The region around the dam is characterised by gentle undulating hills and slopes (Ackerman, 2000).

#### 1.2.4 Geology and Soils

Geology in the Injaka Dam region is dominated by granites and granodiorites of the Basement Complex (Ackerman, 2000). The valley flanks consist mainly of a residual granite soil, interspersed by completely weathered dolerite dykes. The dam wall is founded on highly erodible decomposed granite into which diabase dykes have intruded. The upper horizon of the decomposed granite comprising the foundation of the dam wall was found to be collapsible, (See **Figure 2** for Geology Map).

The soils in proximity to Injaka Dam have a medium to high collapse potential due to a low density and are prone to dispersion (Ackerman, 2000).

#### 1.2.6 Hydrology

The Sabie River catchment forms part of the larger Inkomati River basin, which is an international drainage basin traversing over South African, Swaziland and Mozambican borders (Sudlow, 2004). The Marite River is 58km long from origin to where it meets the Sabie River near Hazyview (Deacon, 1996). Injaka Dam is located roughly in the middle of the Marite River system on the foothills of the Drakensberg Escarpment (Sudlow, 2004). The catchment of Injaka Dam is 209 km<sup>2</sup> (Ackerman, 2000) which forms part of the 6347 km<sup>2</sup> catchment of the Sabie River that lies within South African borders (Sudlow, 2004).



Figure 2: Geology Map for Injaka Dam



Figure 3: Topography / Slope Map for Injaka Dam

#### 1.2.6.1 Water Quality

Characteristics	Test Results	Water Quality Target Range (Recreational Purposes)	Description
pH (pH units)	7.9	6.5-8.5	The pH of water is well within Quality Range and the buffering capacity of the lachrymal fluid of the human eye. Skin, ear and mucous membrane irritation is absent.
Electrica; Conductivity in mS/m	3.5	0-70	No health effects associated with electrical conductivity of water are expected < 45 mS/m.
Sulphate (mg/l)	<5	0-200	No health or aesthetic effects can occur.
Chloride (mg/l)	<5	0-100	No health or aesthetic effects can occur.
Nitrate (mg/l)	<0.2	0-6	No health or aesthetic effects can occur.
Free and Saline Ammonia (mg/l)	<0.2	0-1.0	No health or aesthetic effects can occur.

 Table 2: Water Quality for Injaka Dam (DWS: RQS, 2013)

According to the water quality results which were sampled by ICMA, 2014 the water quality in the dam is of good condition with exception to E.coli in some months were it was relatively high with a slight risk of gastrointestinal effect among swimmers and bather, negligible effects are expected in isolated instances only. to 2015, and is showing that the water level is at 93.3 % lower than that of 2014 which was 100.1%.

The dam is located in the X31E Quaternary Catchment within the Inkomati Water Management Area in the Sabie sub-catchment area. See **Figure 4** for Hydrological Map.

#### 1.2.6.2 Water Surface

The dam impounds the Marite River, **figure 4** shows the fluctuation in water level from 2014



Figure 4: Fluctuation of Water level in the Injaka Dam, 2015



Figure 5: Hydrological Map for Injaka Dam

#### 1.3 BUILT ENVIRIONMENT

#### **1.3.1** Transport networks

The roads to the dam are of good condition but needs to be maintained for them to stay in this good condition.

#### 1.3.2 Parks

There are no recreational parks at the dam.

#### 1.3.3 Buildings

There are no permanent and temporal structures which have been built to accommodate recreational activities at the dam, reason being that the plans which were documented for recreational use were never implemented for the dam.

#### 1.3.4 Maviljan Ponds (Waste Water)

There are waste water ponds upstream of the dam, in 2014 there were leaking into the dam, and these caused a negative impact on the water quality of the dam.

#### 1.4 USES AND USERS OF THE DAM

#### 1.4.1 Primary Function

#### 1.4.1.1 Agricultural Use

There are scattered irrigation land around the dam which belongs to the community members for subsistence farming.

#### 1.4.1.2 Afforestation

Large areas around the dam are planted with Blue Gum and Pine and abandoned Coffee Plantations (Ackerman, 2000). It was estimated that 69 000 ha of the Sabie River catchment was replaced with exotic afforestation in 1972. Since then a permit system controls additional exotic afforestation to a moderate increase in the catchment (Sudlow, 2004).

#### 1.4.1.3 Domestic Use

The dam provides raw water to the BLM which they provide drinking water to the community.

#### 1.4.2 Secondary Function

#### 1.4.2.1 Recreational Use

Currently the recreational use of the dam is not active due to lack of infrastructure for recreational use, community members only practise fishing occasionally at the dam.

#### 1.4.3 Other Function

#### 1.4.3.1 Residential Use

There are houses which have been built very close to the dam and they cause safety risks like drowning and houses might be washed away or destroyed during disasters like floods.

#### 1.5 RECREATIONAL INSTITUTIONAL STRUCTURE

There is no formal institutional structure managing the recreational use of the dam. However, DWS is the owner and operator of the dam.

#### 1.5.1 Management of Water Surface

The management of the surface water in terms of operation of the Dam is done by DWS.

In addition to the DWS, Local Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWS and thereafter the permission by SAMSA.

#### 1.5.2 Event Management

Permits are should be issued by DWS prior to any event undertaken at the dam.

#### 1.6 LAND OWNERSHIP

DWS is the owner of Injaka Dam and the purchased boundary.

The dam covers an area that affect a number of Tribal Authorities of which the following where identified, engaged and have registered as stakeholders in this process: Kgarudi Tribal Authority; Thabakgolo Tribal Authority; and Mathibela Tribal Authority.

#### 1.6.1 Land Claim

There are seven (7) land claims which have been lodged on the farms Injaka 267 KU and Waterval 273. The claimants are the Injaka-Waterval community, as defined in terms of **Section 2 of the RLRA** as amended. The community comprises of the originally dispossessed people. Department of Land Affairs (DLA) as the successor in title to the South African Development Trust and former Lebowa Government currently owns a greater part of the farms Injaka 267 KU and Waterval 273 KU. A part of the land under claim is used for forestry purposes.

The greater part of the claimed land is not being used, except by local residents for seasonal cropping. A portion of the Injaka 267 KU was previously used for coffee production by the Agricultural Rural Development Corporation (ARDC). Currently, the project has been abandoned.

#### 1.7 SAFETY

The dam is only fenced at the dam wall. There are no access controlled areas at the dam. The dam can be accessed from any point, this has led to drowning incidents and criminal activities at the dam, where people are beaten, killed and then thrown into the dam. There is a risk of crocodiles and hippopotamuses attacks at the dam.

#### 1.7.1 Safety of Navigation

There is currently no adequate, standardised and harmonised fixed and floating Aids to Navigation<sup>2</sup> (AtoN) and Demarcation Markers in place.

#### 1.7.2 Incident Management

There is no specific incident management system in place to ensure that incidents are responded to in a co-ordinated manner.

#### **1.8 SOCIO-ECONOMIC ENVIRONMENT**

The main purpose of social audit is to examine the general status of the study area and to determine issues that need to be addressed when developing the RMP in order to overcome potential difficulties in an area. The study area falls within Ward 9 of the BLM. An understanding of socio-economic conditions of Ward 9 can be used at a later stage to determine the impact of a RMP in the area in terms of changed socio-economic conditions.

A social Audit which focused on the population composition of the ward, Education level, employment status and monthly income was undertaken and is presented in section 1.8.1.1 to 1.8.1.3, respectively.

#### 1.8.1.1 Population dynamics

According to Census (2011), BLM has a total population of 541 248, where a portion of Ward 9 contains 3%. Job opportunities can be generated easily since Ward 9 of BLM contains a minimum percentage of the population size as shown in **Figure 6**.

<sup>&</sup>lt;sup>2</sup> A maritime Aid to Navigation (AtoN) is defined by the international Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) as "A device or system external to vessels that is designed and operated to

enhance the safe and efficient navigation of vessels and/or vessel traffic"



Figure 6: Population Dynamics of Ward 9 versus BLM

#### 1.8.1.2 Education level

The Census (2011) breaks down educational levels into each year of study. For the purpose of this report, the educational levels are grouped into schooling, matric and higher education and functional literacy categories.

As illustrated by the table, 74% of the total population is literate.

Education indicators	Ward 9 (2011)
Schooling	18.6%
Matric and Higher Education	33.1%
Functional Literacy rate	74%

#### Table 3: Education level of Ward 9 (2011)

#### 1.8.1.3 Employment status

Bushbuckridge Local municipality's In households' income is relatively low in the province as its ranked number 13 as per department of finance 2011 report. An income of R9601 - R19 600 has the most households surviving on it followed income from R19 601-R38 200 with 29 927. The average households' income is R36 569.

Income	Number of households
R1 - 4800	12075
R 4801 - R 9600	20199
R 9601 - R 19 600	29927
R19 601 - R 38 200	25684
R38 201 - R 76 400	10962
R 76 401 - R 153 800	6571

Courses Station on concurs 2011	
R 2 457 601 or more	83
R 1 228 801 - R 2 457 600	102
R 614 001 - R 1 228 800	240
R 307 601 - R 614 400	1504
R 153 801 - R 307 600	3976

Source: Statics sa census, 2011

#### 1.8.1 Community Beneficiation

It is DWS's belief that Local Communities should equally share the benefits emanating from the utilisation of the dam for recreational purposes, by ensuring that they have both physical access to the resource, as well as access to the water-based recreation economy.

According to DWAF (2006), by ensuring that the Local Communities move beyond merely being affected by or living close to a water resource, but rather undertaking the transition to become participants will ensure that water resources can and will be protected by the people closest to and most affected by the dam.

The community will benefit in amongst others the following ways:

- By having equitable access to the dam; •
- The community needs will he addressed in an appropriate and equitable manner;
- By being safe while accessing and using the dam;
- By being given first preference when there are employment opportunities and skills development;
- Through the PPP; and
- By participating in decision-making with respect to major developments planned or proposed for the dam (Dam Management Committee).

# **CHAPTER: 2 LEGISLATIVE FRAMEWORK**

The RMP forms the overarching framework for the management of Injaka Dam. It is informed by relevant policy, legislation and planning documents administered by other government departments. Similarly, these government departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996), Section 24: Provides that, everyone has a right to an environment that is not harmful to their health or well-being.
- II. **Conservation of Agricultural Resource** Act, 1983 (Act No. 43 of 1983): Provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith. Regulation 7 and 8 within the same Act deals with the protection of wetlands and water courses, while regulations 15 and 16 deals with Alien Invasive Plant Species and bush encroachment.
- III. Consideration on Institutional Arrangement for Managing Use of Water for Recreational Purposes (DWAF, 2003): It outlines some of the institutional issues at a local level and makes recommendations about the conditions under which different Institution Management arrangements may be considered.
- IV. General Public Participation Guidelines (DWAF, 2001): Public Participation refers to the ongoing interaction between Role Players and all stakeholders that is aimed at improving decision making during planning, design, implementation and evaluation of all projects within the

state, this includes the proposed development of the RMP.

- v. Government Immovable Asset Management Act, 2007 (Act No. 19 of 2007): To provide for a uniform framework for the management of an immovable asset that is held or used by a national or provincial department; to ensure the coordination of the use of an immovable asset with the service delivery objectives of a national or provincial department; to provide for issuing of guidelines and minimum standards in respect of immovable asset management by a national or provincial department; and to provide for matters incidental thereto.
- VI. Government Notice R654 dated 1 May 1964, in terms of the Water Act, 1956 (Act No. 54 of 1956): Regulates access and use of government waterworks for recreational purposes.
- VII. Guidelines for Compilation of Resource Management Plans (DWAF, 2006): Directs and guides the development of RMPs by providing insight into the purpose and objectives of these plans, the procedure for its compilation and structure of such documents.
- VIII. Merchant Shipping (National Small Vessel Safety) Regulations (2007): These Regulations provide *inter alia* for:
  - Requirements for vessel safety;
  - Crewing requirements and responsibilities;
  - Controlled events such as competitions and regattas; and
  - Responsibilities of authorised agencies (governing boards/clubs/organisations and regulating authorities.

These Regulations apply to the Department of Water and Sanitation

as they are applicable to all inland and sheltered waters and as the Department and its agencies are allowing access to government waterworks for recreational boating vessels.

- IX. Methodology for Carrying Capacity Assessment for the Use of Water for Recreational Purposes (DWAF, 2003): The carrying capacity of a water resource represents the maximum level of visitor/recreational use and related infrastructure that the water resource and surrounding area can accommodate, without diminishing user satisfaction or adverse impacts upon the local or host community, the economy and culture of the area.
- X. National Environmental Management Act, 1998 (Act No. 107 of 1998): NEMA serves as South Africa's Environmental Framework Legislation. It was designed to provide for co-operative and Integrated Environmental Governance by establishing a general framework for decision-making on matters affecting the environment.
- XI. National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and Related Regulations: This Act aims to provide the framework, norms and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources.

The Alien and Invasive Species Regulations for this Act came into effect 01 October 2014. NEMBA together with these Regulations aim to prevent the introduction and spread of alien and invasive species across South Africa.

XII. National Environmental Management: Protected Area Act, 2003 (Act No. 57 of 2003): The aim of this Act is to provide for the protection and conservation of ecologically viable areas, which are representative of South Africa's Biodiversity, as well as natural landscapes and seascapes.

- XIII. National Treasury Public Private Partnership (PPP) Toolkit for Tourism, 2005: This toolkit assist the process of development of tourism-based businesses on State-owned Land. The Toolkit make it easier for Institutions and the Private Sector to enter into tourism related partnerships on State Property managed by National and Provincial Government Institutions.
- XIV. National Water Act, 1998 (Act No. 36 of 1998): The purpose of the Act is to ensure that the nation's water resources are protected, used. developed, conserved, managed and controlled in a sustainable and appropriate manner, for the benefit of all. Furthermore Section 113 of the Act states that the water of a government waterworks and surrounding state owned land may be made available for recreational purposes, subject to controls determined by the Minister and regulations made by the Minister.

Using water for recreational purposes is a water use under Section 21K and can be exercised as permissible use of water under Schedule 1 of the Act. However, this provision does not cater for commercial use hence the RMP should be implemented in line with General Strategic Plan for commercialisation of Tourism Public Private Partnerships at Government Waterworks, 2009 and PFMA Treasury Regulation 16.

Once the RMP has been approved, the RMP will regulate access and use of the dam. It is important to note that users will need to comply with other relevant legislation.

XV. Operational Policy: Using Water for Recreational Purposes (DWAF, 2004): This policy is the main guideline in support of the RMP process with regards to the basic principles, policies, strategies and actions for regulating the use of water for recreational purposes.

- XVI. Public Finance Management Act (PFMA) (Act No. 29 of 1999): Section 76 of the Act secures transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of government departments. The Act promotes the objective of good financial management in order to maximise service delivery. The Act allows DWS to enter into PPP agreements with the private sector for the commercial use of state assets.
- XVII. Safety at Sport and Recreational Events Act, 2010 (Act No. 2 of 2010): Events management is addressed by Safety at Sport and Recreational Events Act (Act No. 2 of 2010). This act deals with ensuring responsibility for safety and security at events. The act deals with among other things,
  - Responsibility for safety and security at the events;
  - Risk categorization of events; and
  - Safety certificates.
- XVIII. South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998): One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.
- XIX. Water Services Act (Act No. 108 of 1997): The Act outlines the roles and responsibilities for the supply of water and sanitation to citizens. It also recognises the rights of all humans to basic water supply and sanitation services.

The RMP process also takes cognizance of the following Legislations, Policies, Programmes and Reports:

- Broad-based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003).
- Communal Land Rights Act, 2004 (Act No.11 of 2004).
- Development Facilitation Act, 1995 (Act No. 67 of 1995).
- Disaster Management Act, 2002 (Act No. 57 of 2002).
- Environmental Conservation Act, 1989 (Act No, 73 of 1989).
- Human Tissue Act, 1983 (Act No. 65 of 1983 as amended).
- Intergovernmental Relations Framework Act, 2005 (Act No.13 of 2005).
- Land Administration Act, 1995 (Act No. 2 of 1995).
- Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000).
- National Development Plan (Vision for 2030).
- National Heritage Resources Act, 1999 (No. 25 of 1999)
- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)
- Occupation Health and Safety Act, 1993 (Act No. 85 of 1993).
- Restitution of Land Rights Act, 1994 (Act No. 22 of 1994).
- State Land Disposal Act, 1961 (Act No. 48 of 1961).
- Sustainable Development Goals (2015)
- Tourism Act, 1993 (Act No. 72 of 1993).
- Safety of Navigation: In addition to its common-law responsibility, DWS is, in terms of the requirements described in the National Water Act, Act No 36 of 1998, amongst others, responsible for the safety of Government's waterways and watercourses, including its dams. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating AtoN for general navigation.

Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWS and thereafter the permission by SAMSA. In order to demarcate specific zones/areas, standardised demarcation markers are to be used in conjunction with the relevant AtoN.

SAMSA Marine Notices and its Directive on the Standardisation of fixed and floating AtoN and Demarcation Markers on all navigable Inland Waterways in the Republic of South Africa.

The aim is to enhance the development of a best practice model to ensure a safe and structured inland maritime environment and culture, whilst protecting the country's precious water resources.Not only do these Acts, Regulations and Frameworks guide specific decisions and actions, they also provide the framework for monitoring performance and compliance, and provide guidelines regarding contravention, offences and penalties. This list is not extensive, other legislation could be applicable.

# **CHAPTER 3: WHAT IS A RESOURCE MANAGEMENT PLAN**

#### 3.1 DEFINITION OF RMP

A Resource Management Plan (RMP) is a plan which aims to regulate access and the recreational utilization of a water resource and the surrounding state land, in ways which promote community participation and beneficiation, environmental conservation and unlock socio-economic potential of the water resource.

Recreational use includes activities ranging from leisure, sport to culture and religion. Although recreational use does not involve water consumption, it is still a major water use and needs to be managed correctly to ensure increased community participation and beneficiation with minimal disturbances and environmental impacts.

The RMP requires a five (5) year revision and an annual revision for the BP to ensure that management objectives remain relevant and management actions are continually improved.

#### 3.2 PURPOSE OF THE RMP REVIEW

The purpose of the RMP review is to ascertain its contribution to the attainment of the

Description **Trigger Factors Alien vegetation** There are scattered alien species around the dam including the Lantana Camara, Melia Azedarach and Blue Gum plantation for commercial purposes, these alien species consume large quantities of water. **Resource Management** Water Quality Pollution in the dam through the leaking of Maviljan Ponds (wastewater) and the disposal of nappies in the river which flows into the dam. Public safety There are drowning and criminal incidents at the dam where people are • **Recreational Industry** killed and thrown into the dam. Involvement There is a concern regarding the community safety when accessing the . dam as there are no designated public access areas at the dam.

#### Table 5: Trigger factors for Injaka Dam

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National Water Act, 1998 (Act No. 36 of 1998) objectives by ensuring effective engagement of communities affected and interested in the water resource and its utilisation, and also the engagement of industry key role players.

The RMP review also ensures that the plan is based not only on ecological principles but also on the needs and expectations of communities and the recreation industry.

The existing RMP for Injaka Dam was approved on **23 March 2007**. However, it was never implemented.

#### 3.3 PROCESS TRIGGERS

Triggers Factors are factors that have encouraged DWS to initiate and commission the development of RMPs.

A number of generic factors have been identified by DWS for the development of RMPs, however, the Process Facilitator identified site specific trigger factors for Injaka Dam, as illustrated in **Table 3**.

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW

Trigger Factors	Description	
	Community and economic opportunities exists	
	• Development and improvement on the participation and beneficiation	
	of local communities.	
	Review and update of the existing objectives of the RMP and ensuring	
	that these objectives are implemented in the RMP.	
<b>Community Participation and</b>	Public Participation Partnership	
Beneficiation	• Review of the proposed institutional structure which was supposed to	
	be managing the recreational activities.	
	Local Planning Initiatives	
	• Integration of the Injaka Dam in other planning initiatives and decision	
Public Policy	support tools such as the Integrated Development Plan (IDP),	
	Environmental Management Framework (EMF), Strategic Development	
	Framework (SDF), etc.	

#### 3.4 RMP REVIEW FRAMEWORK

objectives remain relevant and management actions are continually improved, **Figure 6** illustrates a RMP and BP Review Framework.

According DWAF (2006), the RMP requires 5yearly revisions to ensure that management



Figure 7: RMP Review Framework

#### 3.5 RMP PLANNING STAGES

#### 3.5.1 Desktop Study

The desktop study was conducted with the aim of acquiring background information about the Inyaka Dam. This was done through literature review. This study provided information such as the location of the dam, user groups, current activities, previous studies conducted for the dam.

#### 3.5.2 Site Inspection

A site inspection was conducted at Injaka Dam on **29 May 2014** to gather baseline information using a checklist questionnaire. The site inspection was undertaken with DWS official (Dam operator). The dam wall, the bridge which was constructed recently, the Maviljan Ponds (wastewater) and other parts of the dam were visited as part of the information gathering process. Photos of the study area were also taken during site inspection.

#### 3.5.3 Public Participation

Public Participation process (PP) is a process in which potential Interested and Affected Parties (I&APs) are given an opportunity to comment on or raise issues relevant to specific matters. The three (3) fundamental and theoretical objectives of PP process as stipulated in the DWAF's Guideline for Public Participation (2001) are:

- To improve decision-making;
- To bring about sustainable development; and
- To normalise the attitudes of stakeholders (Authorities and I&APs).

The public participation for this project was formulated to include the following objectives:

- To engage the Stakeholders (Authorities and IAPs) in the review process;
- To present opportunity to other Stakeholders who were not part of the RMP development process;
- The answering of questions and noting of concerns;
- The identification of new important issues or challenges as well as other objectives that were not incorporated in the existing RMP; and

• To verify if the previously identified objectives and vision for the dam is still relevant.

DWAF's Guidelines for Public Participation (2001) outlines three (3) broad phases for public participation namely the **Planning**, **Participation** and **Exit phase**. Summarized below are the aspects of each phase and the approach for this project.

#### 3.5.3.1 The Planning Phase

Planning phase entails three (3) important aspects namely:

- Decision analysis;
- Participation planning; and
- Implementation planning.

During the **Planning Phase** a site inspection and literature review was conducted to gather baseline information about the dam. A process was also established to get into contact with the I&APs and relevant Authorities to ensure co-operative interests and support in the RMP project.

#### 3.5.3.1.1 The Role Players

It is recognized that different roles and of the responsibilities stakeholders (Authorities and I&APs), and their relationship towards each other and the steps in the planning procedure are imperative in the successful development of the RMP. It is also important that proper consultation with the public is done in order to produce a credible RMP. As such, the success of the RMP is dependent on the level of involvement of the various stakeholders. Various stakeholders were identified and invited to participate in an open and consultative process. (See attached Appendix B). The stakeholder list is updated on a continuous basis throughout the RMP process.

#### 3.5.3.2 Participation Phase

The **Participation Phase** entails three (3) important aspects:

- Informing stakeholders explained briefly under **3.5.3.4 Advertising process**
- Meeting the Stakeholders explained briefly under 3.5.3.5 Direct Communication

 Feedback – it is of utmost importance that feedback is directed to and from Stakeholders. In this project feedback thus far has been given in a form of minutes of the meetings and follow-up emails.

#### 3.5.3.3 Exit Phase

The **Exit Phase** entails two (2) important aspects namely:

- Ensuring that all goals, challenges, concerns, objectives and the vision for the dam have been identified and documented in the RMP.
- Officially ending the public participation process for the RMP process.

During this phase, a draft RMP will be presented to the stakeholders so that they can comment and give inputs.

#### 3.5.3.4 The Advertising Process

#### 3.5.3.4.1 Compilation and Distribution of Background Information Document (BID)

The purpose of this document was to provide Stakeholders (Authorities and I&APs) with the background information about the proposed RMP project and to introduce the processes to be followed in developing the plan. It also aimed to inform authorities and I&APs on how to fully participate in the process and to encourage active attendance in Stakeholder engagement meetings. The BID was compiled from the information collated through the desktop study and site inspection (See attached **Appendix C**).

#### 3.5.3.4.2 Newspaper Advert

A Newspaper advert regarding the RMP project was placed in the **Mpumalanga News** newspaper. The advert invited the public to attend the Public Participation Meeting. The advert was published in English on **23 October 2014.** Furthermore, an advert for the draft RMP Report was placed on **Mpumalanga News** Newspaper on **21 January 2016.** (See attached **Appendix C: Newspaper Advert).** 

#### 3.5.3.4.3 Flyers Compilation and Distribution

Flyers were also used as a form of notification, they aimed at informing I&APs about the public consultative meetings. The flyer detailed a brief description of the RMP, meeting date, time, venue and relevant contact details. The flyers were compiled in English and were distributed on **26 October 2014**.

Flyers for the draft RMP were distributed on **18** January **2016 (See attached Appendix D).** 

#### 3.5.3.5 Direct Communication

#### 3.5.3.5.1 E-mails

Meeting invitations were sent out to authorities and I&APs notifying them about the scheduled consultative meetings. The invitations entailed the BID, meeting venue and time. The email notification were sent out on **31 October 2014**.

Moreover, the email invites for the draft RMP were sent on **19 January 2016**. (See Attached Appendix E).

#### 3.5.3.5.2 Authority Meeting

The initial authority meeting was held on 13 November 2014 at Busisiwe Ngqubushe Community Hall.

The purpose of the meeting was:

- To present the RMP Review, its goal and the objectives of the project to the authorities; and
- To allow the authorities an opportunity to participate in the project by sharing information on their respective mandates.

The draft RMP Report was supposed to be presented to the authorities on **04 February 2016**, but there was a poor attendance and as such the meeting was postponed to **17 May 2016**, and even so the meeting did not take place as there was a poor attendance on the meeting.

#### 3.5.3.5.3 Public Meeting

The initial public meeting was held on 13 November 2014 at Busisiwe Ngqubushe **Community Hall**. A platform was also given to I&APs to identify other challenges and objectives that were not incorporated in the existing RMP.

The draft RMP was presented to the public **04 February 2016.** 

#### 3.5.3.5.4 Comments and Responses Register

A copy of the draft report was circulated on **18** January **2016** for commenting. The commenting period was to lapse on **31** May **2016.** (See Appendix F: Comments and Responses Register).

#### 3.5.4 Planning Partners

RMPs are developed through a process of cooperative governance and Stakeholder participation. The distinctly different roles and responsibilities of the stakeholders, and their relationship towards each other and the steps in the planning procedure are imperative in the success compilation of the RMP.

The RMP provides for coordination between different governments and agencies to ensure that not only the objectives of DWS are attained, but also the objectives of other relevant Government Departments are attained. Such Departments includes among others as outlined in **Table 4.** 

**Table 6:** Planning Partners and their Respective Mandate

Department/ Agency	Mandate
Bushbuckridge Local Municipality	The dam is within the jurisdiction of the municipality
	and is mandated to provide bulk water services.
	The purpose of DAFF includes sustainable
	development and management of resources to
	maximizing the economic potential of the fisheries
	sector while protecting the integrity and quality of
	the country's aquatic ecosystems.
Department of Agriculture. Forestry and Fisheries	
(DAFF)	Operation Phakisa expansion to inland dams is one of
	DAFF initiative aimed at unlocking economic
	potential of fisheries sector within the inland water.
	implementation of concernation policies while
	implementation of conservation policies while implementing job creation within fichery and fich
	nrocessing market
Department of Rural Development and Land Reform	The department will assist in terms of Land
(DRDLR)	Claims/Ownership issues.
	Responsible for Biodiversity Management within the
Department of Environmental Affairs (DEA)	dam including Invasive Alien Species.
	Has the power to regulate and control the use of state
	land outside the GWWs. In this regard, lease
Department of Public Works (DPW)	agreements or permits will be required from the
	department as some of the recreational activities will
	overlap into the state land.
	Responsible for legislation, policy and regulations for
Department of Transport (DoT)	all transportation in South Africa, including shipping
	and other transport by water or sea also inland
	waterways.
	Treasury Bogulations requiring DWS to plan
National Treasury (NT)	concessions in compliance or association with
	National Treasury guided by the Tourism Public
	Private Partnershin (PPP) Toolkit of 2005

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW

Department/ Agency	Mandate
South African Maritime Safety Authority (SAMSA)	One of SAMSA's three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant marine legislation.
#### 3.6 RMP DATA ANALYSIS

#### 3.6.1 Encumbrance Survey (Phase 2)

The purpose of the Encumbrance Survey is to investigate/ ascertain whether any encumbrances exist around the dam and other factors that may influence the development and implementation of the RMP. The survey also identifies the information that is required for effective decision-making regarding the RMP (DWAF, 2006).

The existing RMP has highlighted and unpacked various issues at the dam. However, most of the issues are still not addressed as the existing RMP was not implemented.

Listed below are the previous and current encumbrances.

#### **Previous Encumbrances:**

Below are the encumbrances which were identified when the RMP was initially developed in 2007 for Injaka Dam:

 Conditions within and around the dam were presenting safety risks including overhead transmission lines; the new road bridge; incomplete data on the bottom profile of the dam; submerged trees; three (3) partially submerged islands; and a submerged weir at the water treatment works;

- Biophysical encumbrances including the lack of data on water quality and the possibility that crocodiles and hippopotamuses may occur within the dam; - IUCMA have provided the water quality data;
- Expectations regarding benefits emanating from tourism and agriculture;
- Lack of clarity regarding PPPs;
- Unclear relationships between different spheres of Government;
- Servitudes and rights of use of State assets on the State Land surrounding the dam for servitudes registered against the title deed;
- Understanding of the dynamics surrounding the land claims; and
- A political encumbrance has recently arisen in the form of a proposal to change the municipal boundaries in the study area proposed by the municipal demarcation board.- the municipal boundaries has been changed which also affected the provincial demarcation, the dam used to fall under the Limpopo Province now it falls under Mpumalanga Province.

#### **Current Encumbrances**

The identified encumbrances are broken down into **Biophysical, Social and Legal.** See **Tables 5-7** 

Item	Description			
Fauna	<ul> <li>There are hippopotamuses and crocodiles in the dam, which might put people's lives in danger when engaging in some recreational activities like swimming and fishing.</li> <li>People are practicing net fishing which depletes the fish species in the dam.</li> </ul>			
Water Quality	<ul> <li>There is a problem of water quality in the Bushbuckridge area due to disposal of nappies into the water resource which in turn pollute the water.</li> <li>The Maviljan ponds which are upstream of the dam were leaking into the dam, the water quality is a major concern as people are provided bulk water from the same source.</li> </ul>			
Flora	<ul> <li>Most part of the dam is surrounded by afforestation plantations of Blue Gum and pine and these species consume large quantities of water.</li> <li>There are alien vegetation like <i>Lantana camara</i> and <i>Melia azedarach</i> which threatens the existence of indigenous species and also negatively affect the water quantity of the dam.</li> <li>There are submerged vegetation and tree stumps which put people's lives in danger when engaging in recreational activities especially when the water level of the dam is high and are not visible.</li> </ul>			

Table 7: Summary of Biophysical Encumbrances

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW

#### Table 8: Summary of Legal Encumbrances

Item	Description
Land claims	• There are seven (7) land claims which have been lodged on farms Injaka 267 KU and Waterval 273. The claimants are the Injaka-Waterval community, as defined in terms of <b>Section 2 of the RLRA</b> as amended. These land claims do not affect the dam and the purchased boundary of DWS.

#### Table 9: Summary of Social Encumbrances

Item	Description					
Mobility	• There is a good tarred road where the dam is situated, which make the dam easily accessible.					
Expectations	• People are expecting job opportunities and skills transfer from the implementation of the RMP.					
Public safety	<ul> <li>Some of the community members are being killed and dumped into the dam.</li> <li>There are drowning incidents which have occurred in the past.</li> <li>The people staying in Mapulaleng are living very close to the dam which put their properties vulnerable during floods and also drowning of children into the dam.</li> </ul>					

Upon identifying the encumbrances, objectives needed to be identified in order to facilitate a planning procedure aimed at the review of a RMP. It is essential to clarify objectives to be met by the planning procedure (DWAF, 2006).

#### 3.6.2 SWOT Analysis and Objective Identification

The SWOT Analysis was conducted to gather Strengths and Opportunities that define the potential of the dam whereas the challenges regarding the dam where identified through Weaknesses and Threats. The common key objectives were formulated and identified from the Strengths and Opportunities of the dam. Moreover, the vision for the dam for a period of 20 years was formulated by stakeholders from the identified objectives.

#### 3.6.2.1 SWOT Analysis Approach

There were issues of concerns that were raised in the stakeholder engagement meetings prior to conducting the SWOT Analysis. Other challenges or encumbrances that may hinder the progress of the dam's RMP process were identified by the stakeholders following the SWOT analysis approach as illustrated in **Table8.**Only opportunities and Threats were identified. 
 Table 10: SWOT Analysis for Injaka Dam

Opportunities	Threats		
<ul> <li>There should be job opportunities and the first priority should be given to local communities.</li> <li>To establish swimming pools to teach children how to swim to avoid drowning incidents.</li> <li>To establish a golf course for the local people.</li> <li>Most people have business ideas but don't have money to fund those business ideas.</li> </ul>	<ul> <li>There are Hippopotamuses and crocodiles in the dam which cause threats to people's lives.</li> <li>No water provision in the area and might lead to people not participating in recreational activities.</li> <li>There are illegal activities which are taking place in the dam which causes a threat in tourism industry and also for investors who are willing to invest in the tourism industry.</li> <li>Net fishing is a threat to fish species, it depletes the fish in the dam and some people depend on fish for their livelihood.</li> <li>The people staying in Mapulaneng are living very close to the dam, children might drown and also leaves their property vulnerable during floods.</li> <li>There is corruption when it comes to awarding of tenders and other people will be awarded tenders unnecessarily.</li> <li>The community is concerned about its safety because the dam is not fenced and already there are drowning incidents and criminal activities at the dam.</li> </ul>		

#### 3.6.2 Objective Identification (Phase 3)

The users put forward their specific objectives during the development of the existing Injaka Dam RMP in order to establish common goals among the user groups.

Objectives were reviewed by all the stakeholders in order to update if there are any other new objectives to be added on the existing document. Furthermore, new objectives were identified by all the stakeholders in order to ascertain common goals.

The objectives address the following questions:

- What do we want?
- How are we going to achieve this?
- Who will be involved?
- By when would we like to achieve our goals?
- Why would we want to achieve our goals?

The common key objectives have been categorized into three (3) Key Performance Areas (KPAs) as illustrated below:

#### **Previous Identified Objectives**

#### **KPA 1: Resource Management**

- To maintain and enhance the system's present character and to minimize impacts on the natural landscape;
- To determine sustainable carrying capacity for resource utilization and limits of acceptable change and to accordingly monitor utilization impacts;
- To provide sustainable utilization of the natural resources of Injaka Dam in a manner that optimizes income and other benefits without compromising the primary and secondary objectives;
- To research, document and protect the cultural resources within the area, with specific consideration to the paleontological, archaeological, historical and cultural heritage resources applied in

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the following descending order of priority: international, national, provincial and local;

- To document the history of the Injaka Dam, specifically the history of the farm and valley;
- As part of the tourist experience, to provide insight into the establishment and purposes of the dam, and the cultural heritage resources associated with the area; and
- The primary objective for land expansion and incorporation is to incorporate all land within the Injaka Dam sphere of influence under formal co-management agreement. Expansion will be considered if it enhances the natural resource management and business objectives of the dam by significantly enhancing the tourist experience available at Injaka Dam.

### **KPA 2: Resource Utilisation**

- To optimise tourism and economic development opportunities in an equitable manner based on the opportunities and constraints posed by the dam and surroundings;
- To formalise relationship with operators, ensuring that all activities are authorised in terms of relevant legislation;
- To ensure that private sector involvement is equitable and that market related fees are paid for the use of Injaka Dam;
- To address the needs of the public in an appropriate and equitable manner;
- To encourage outsourcing of public access facilities and to define operating and safety

rules in co-operation with contractors and operators, and create awareness regarding these rules;

- To ensure that all infrastructural development enhance the sense of place of the dam, while complying with all environmental and related regulatory requirements;
- All infrastructural development must be planned to ensure that it is cost effective, appropriate and contributes to attaining the objectives of the dam;
- To control and limit infrastructural development through authorizations and conditions attached to agreements and contracts;
- To develop a unique branding for the dam that can be well marketed;
- To ensure consistency and accuracy regarding the content of marketing material and programs; and
- Optimize economic and social benefits locally and for the region through the establishment awareness regarding the dam, its products, and programs.

### **KPA 3: Benefit Flow Management**

- To facilitate the establishment of a Benefit Flow Institution (BFI) or appropriate institutional arrangements consisting of representatives from neighbouring communities and selected external persons as a vehicle to oversee and distribute community benefits equitably and fairly; and
- To stimulate local economic activities through training, capacitation and empowerment programmes.

 Table 11: Summary of Objectives identified in 2007

	Resource Management	Community Beneficiation
• • • • •	<ul> <li>Keep corruption out of the system (there should be concessions when tenders are awarded.</li> <li>Compliance to the environmental legislation.</li> <li>Proper environmental assessment.</li> <li>Proper waste management planning.</li> <li>Adequate involvement in catchments management planning.</li> <li>Protection of indigenous forest.</li> <li>Protection of biodiversity according to all applicable acts and regulations.</li> <li>Aggregate water conservation for the dam (ecosystems and habitats for the systems).</li> <li>Soil conservation.</li> <li>Mining interest (Monitoring functions outside the area of specialty).</li> <li>Watchdog and environmental officer to be appointed.</li> <li>Contribution on scarce resources for the dam.</li> <li>Protection of fish, birds and animal life.</li> </ul>	<ul> <li>Development of infrastructures and skills: <ul> <li>Hotels</li> <li>Guest Houses</li> <li>Flea Markets</li> <li>Tourisms Centres</li> </ul> </li> <li>Land claims must be fast-tracked.</li> <li>Water must be affordable and accessible to all.</li> <li>Trees must be developed for economic purposes.</li> <li>Local people should be able to have access to fishing in the dam.</li> </ul>
	Operations / Recreational Water Use	Institutionalisation
•	Determine the means to build and bring about business around the Injaka Dam (i.e. plan recreational facilities). Development of a forum business, to assist in the negotiations.	<ul> <li>Policies are put in place, outstanding is the implementation.</li> <li>Institution to comply with these policies (compliance with relevant pieces of legislation).</li> <li>Need to promote investment (LED for Injaka Dam to boost local economy).</li> <li>Government in the eyes of the public should conduct itself as one voice.</li> <li>Ensure that there is equitable access to the development (development should not be seen as a separate entity).</li> </ul>

#### **Current Identified Objectives**

#### **KPA 1: Resource Management**

- To improve the water quality of Injaka Dam;
- To keep the dam and the surrounding environment free of alien vegetation;
- To conserve the natural environment in and around the dam in a sustainable manner;
- To prevent net fishing as it depletes the fish species in the dam; and
- To manage the water resource and the surrounding environment in a sustainable manner.

#### **KPA 2: Resource Utilization**

- To promote equitable access and use of the dam by the public;
- To address the needs of the public in an appropriate and equitable manner;
- To establish a swimming pool for the community to eliminate drowning incidents; and
- To establish a spot for a golf course.

#### **KPA 3: Benefit Flow Management**

• To improve the lives of the community through employment opportunities and skills development programs;

- To review the institutional structure which was formed in 2007; and
- To introduce commercial fishery at the dam.

Action projects required to achieve these objectives are provided in detail in **Section 4.3** (The Strategic Plan).

A vision for the dam for a period of 20 years was formulated from the key common

objectives identified by the stakeholders and stands as follows:

"A commitment to unlock the potential of Injaka Dam in a sustainable manner, based on sound business, resource management, and environmental principles that benefit both the water user and affected communities in an equitable manner."

# CHAPTER 4: INTERGRATED MANAGEMENT, ZONING AND INSTITUTIONAL PLAN (PHASE 5)

The purpose of this phase is to evaluate the information obtained from previous stages to ascertain what could be achieved based on specific constraints and parameters of the various input factors such as biophysical, cultural and socio-economic, current institutional and needs of the dam users. The integrated resource management plan (IRMP) will take into account the following:

- Biophysical, Cultural and Socioeconomic and User needs constraints;
- Development potential and requirements;

- Site planning and Zonation;
- Programmes and Plans that will unlock the potential of the water resource; and
- Institution options and legal aspects required to create these programmes and plans.

The IRMP is broken down into four (4) main plans namely the **Institutional Plan**, **Zoning Plan**, **Strategic Plan** and **Financial Plan** as illustrated by **Figure 7**.

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW



Figure 8: Integrated Resource Management Plan

#### 4.1 INSTITUTION PLAN

The Institutional Plan provides a framework for the institutional arrangements at the dam. The proposed management systems includes three (3) committees namely; a Dam Management Committee (DMC), Operations Management Committee (OMC) and National Project Steering Committee (NPSC). The appointed management authorities by DWS at the dams, will also form part of the institutional structure.

#### 4.1.1 Dam Management Committee (DMC)

DMC refers to any party that is interested or affected by the dam and will assist in raising and addressing issues relating to the dam.

One of the main functions of the DMC is to assess commercial opportunities at the dam. As such, an agenda item related to the Strategic Plan for commercialization is required. In addition, changes in water quality, developments in the area, status of Aquatic Invasive Species and education and information programmes should be discussed. The DMC must meet quarterly.

The functions of the DMC include the following (amongst others):

- Seeking resolution for general management issues;
- Monitoring the practical implementation of the RMP and BP;
- Reviewing the feedback received from I&APs;
- Operational management of recreational activities such as ensuring the floating AtoN and demarcation markers are in place and setting times for use of the dam (no recreational activities can take place between sunset and sunrise);
- Conveying the Management Objectives and decisions pertaining to the dam to the relevant stakeholders; and
- Management of the incident management system and wash bays.

**Figure 8** illustrates the proposed user groups that will form part of the DMC.



Figure 9 : Proposed DMC

The DMC will have a number of management tools which will enable proper management of the dam in line with existing Legislations and Regulations requirements.

#### 4.1.1.1 Management Tools

#### **Terms of Reference**

The DMC and NPSC will be guided by Terms of Reference (ToR) regarding roles and responsibilities. ToR is not required for the **OMC** as this is an existing reporting structure. The ToR provide guidance on the following management aspects:

- Roles and responsibility of chairperson;
- Roles and responsibilities of members;
- Minutes and attendance requirements;
- Reporting requirements;
- Management of agreements;
- Management of access objectives;
- Management of development targets;
- Management of water quality monitoring;
- Management of the control of aquatic invasive species;
- Management of development pressure;
- Management of incident management system and wash bays; and
- Management of AtoN and demarcation markers.

#### **Agreements**

One of the main management tool available is the use of agreements to ensure proper use of the dam in line with the RMP vision and objectives.

#### Safety of Navigation Agreements

In addition to its common law responsibility, DWS is, in terms of the requirements described in the National Water Act, 1998 (Act No. 36 of 1998), amongst others, responsible for the safety of GWWs and watercourses, including its dams. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or AtoN<sup>3</sup> for general navigation.

Agreements between SAMSA and DWS, other relevant Parties or Bodies are to be concluded to allow them to:

- Exhibit the relevant AtoN; and
- Establish or deploy the relevant fixed and/or floating AtoN.

#### Access Agreements

All surface water and shoreline access must be formalised. The conditions for such access must be written into the agreement. All illegal practices must be addressed. Appropriate action must be taken to ensure that all parties comply with the requirements of the RMP.

All adjacent landowners and clubs must be made aware that access to the surface water as well as shoreline should only be through authorised access points. Accessing the surface water through unauthorised access points is an illegal activity unless they enter into a formal agreement with DWS. Further, a formal agreement with DWS will be required for all adjacent landowners and recreational clubs that have direct access to the water surface of the dam through constructed slipways, natural slipways or jetties for angling and/or launching of vessels.

The wash bay must be built on State Property as part of the CIWSP. A formal agreement is necessary between DWS and DEA on the management and maintenance of the facility.

#### **Event Applications**

There is an opportunity to utilise the dam for competitive angling events. All events must be managed through an event application process. The application will be submitted to DWS for approval. These applications must follow a specific template and will include the following:

- Number of participants;
- Emergency Response Plan;

<sup>&</sup>lt;sup>3</sup> AtoN refers to any sort of marker which aids the traveler in navigation; the term is most commonly used to refer to

nautical or aviation travel, common types of such aids include lighthouses, buoys, fog signals and day beacons.

- Advertising and branding (will need to be in line with DWS communication requirements); and
- Access points to be used.

Furthermore, all Events must meet the requirements of the Safety at Sports and Recreation Act, 2010 (Act No. 2 of 2010).

#### **National Affiliations**

All recreational clubs should be affiliated to a SASCOC affiliated organisation. The development targets set by the National Organisations must be met.

# 4.1.2 Operations Management Committee (OMC)

There is an existing Chief Director: Infrastructure Operations Management Committee (CD: IO MANCO) within the NWRI which comprises of all directors of four (4) operations (Northern, Southern, Eastern and Central) and is chaired by the Chief Director of Operational Infrastructure within NWRI as illustrated by **Figure 9**.

The committee should meet quarterly discussing matters relating to operations and maintenance of all GWWs. RMP must be a standard agenda item. Any matters relating to the RMP that are outside the scope of DWS will be escalated to the NPSC.



Figure 10: Existing CD: IO MANCO

# 4.1.3 National Project Steering Committee (NPSC)

NPSC is formed by DWS and is made up of representatives from National Government Departments and Implementing Agencies that are relevant in terms of managing the water resource.

The primary function of the NPSC is to provide guidance on recreational water use in terms of

their respective mandates as well as to ensure that continuous support by different Government Sectors is provided to the dam with the aim of achieving sustainable utilisation of the dam for recreational purposes. The NPSC should meet twice a year. **Figure 10** illustrates a typical example of Governmental Departments that will form part of the NPSC:



Figure 11: Proposed NPSC

The role of the relevant departments and Agencies forming part of the NPSC is listed below:

#### Centre for Public Service Innovation (CPSI):

The CPSI is supporting a multi-departmental working group that is developing an innovative approach to inland water and safety integrity. The project, was initiated out of the need to find an innovative, practical and cost-effective way to implement SAMSA' vessel safety regulations on inland waterways and to implement responsible water use within the broader socio-economic context of the country.

The CIWSP is a project piloted by CPSI that is a partnership between multiple Government entities and between the Government and communities. The main aim of the project is to enhance the development of a best practice model to ensure safe and structured inland maritime environment and culture, whilst protecting the country's precious water resource.

#### <u>Culture, Arts, Tourism, Hospitality, Sport</u> <u>Sector, Education and Training Authority</u> (CATHSSETA):

CATHSSETA deals with the approval and financing of training relating to culture, hospitality, tourism and sport sectors.

#### Department of Agriculture, Forestry and Fisheries (DAFF):

The purpose of DAFF includes sustainable development and management of resources to maximizing the economic potential of the fisheries sector while protecting the integrity and quality of the country's aquatic ecosystems.

Operation Phakisa expansion to inland dams is one of DAFF initiative aimed at unlocking economic potential of fisheries sector within the inland water. The latter programme will be used as benchmark for implementation of conservation policies while implementing job creation within fishery and fish processing market.

#### Department of Corporative Governance and Traditional Affairs (CoGTA):

Its function is to develop national policies and legislation with regard to Provinces and Local government, and to monitor their implementation. Other function of the Department is to support Provinces and Local Government in fulfilling their constitutional and legal obligations.

#### **Department of Environmental Affairs (DEA):**

DEA is mandated to give effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. In relation to the RMP, the Department should ensure that Environmental Impact Assessments is undertaken for all activities that triggers EIA Regulations at the dam. Furthermore, DEA through WfW programme can assist to eradicate alien invasive plants species (Blue Gums and Parrot Furthers) and alien invasive fish species at the dam.

#### Department of Public Works (DPW):

DPW has the power to regulate and control the use of state land outside the GWWs. In this regard, lease agreements or permits will be required from the Department as some of the recreational activities will overlap into the State Land, e.g. trail running, biking and running.

#### Department of Rural Development and Land Reform (DRDLR):

The Department is tasked with the facilitation of land claims within the country. They are also involved in rural development by improving both economic infrastructure (such as roads, etc.) and social infrastructure (e.g. communal sanitation and non-farming activities).

#### Department of Sports and Recreation (DSR):

The Department is mandated to promote and develop sport and recreation activities and also in co-ordination of the relationships between the Sports Commission, national and recreation federations and other agencies.

#### **Department of Tourism (NDT):**

The Department is mandated to create conditions for the sustainable growth and development of tourism in South Africa. The Tourism Act makes provision for the promotion of tourism to and in the Republic and for regulation and rationalisation of the tourism sector, including measures aimed at the enhancement and maintenance of the standards of facilities and services utilised by tourists; and the co-ordination and rationalisation of the activities of those who are active in the tourism sector.

#### **Department of Transport (DoT):**

Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea, including small vessels and inland waterways.

#### **Department of Water and Sanitation (DWS):**

DWS through the National Water Act, 1998 (Act No. 36 of 1998) is mandated to protect aquatic and associated ecosystems and their biological diversity as well as to reduce degradation of the water resources. As part of its mandate, DWS initiated the development of RMPs together with the supporting BPs with the aim of ensuring sustainable and equitable development, utilisation and management of GWWs.

#### National Treasury (NT):

The Department is mandated to support the optimal allocation and utilisation of financial resources in all spheres of government. As part of the RMP, The National Treasury Public Private Partnership (PPP) Toolkit for Tourism (2005), will assist the process of tourism-based businesses development on State-owned Land. The Toolkit make it easier for Institutions and the Private Sector to enter into tourism related partnerships on State Property managed by National, Provincial and Local Government Institutions.

# South African Maritime Safety Authority (SAMSA):

Administers and executes maritime related legislation and regulations, including the National Small Vessel Safety Regulations and ensures standardisation, harmonisation and compliance of all marine AtoN in South African waters.

#### South African Police Service (SAPS):

The South African Police Service have been entrusted with the responsibility of creating a safe and secure environment for all people in South Africa as well as to prevent anything that may threaten the safety or security of any community.

## South African Sports Confederation and Olympic Committee (SASCOC):

SASCOC is mandated to promote and develop high performance of sports as well as to act as a controlling body for sports in South Africa. It can also assist to coordinate organise events at the dam.

#### 4.2 ZONING PLAN

According to DWAF RMP Guideline (DWAF, 2006), a site-specific master planning and zoning which describes a framework for the allocation of zones needs to be undertaken based on the results of the Encumbrance Survey and basic Research regarding the Biophysical, Social and Cultural environment as well as the objectives set by the Stakeholders (refer to section **3.6**).

The proposed Zoning Plan will integrate conservation, recreation and development whilst not retarding the primary functions of the dam.

#### 4.2.1 Water Surface Zoning

The water surface zoning provides guidance on permissible and non-permissible recreational activities on the water surface taking into account the biophysical factors of the dam. The Water Surface is zoned as follows:

#### Safety and Security Zone:

It covers a minimum of 100m area from the wall and outlet works indicated by demarcation markers and AtoN. This area is reserved for DWS management purposes.

Management of this zone is aimed at protecting the dam wall and outlet works, as

well as to ensure the safety of the public. This is a no-go zone to the public unless authorized.

#### **Conservation Zones:**

The aim of this zone is to conserve and protect sensitive aquatic habitation at the inlet(s) of the dam. According to Section 12 and 26 of NWA, the existence of these zones is thus not negotiable as it is imperative to protect the water resource for the purposes relating to basic human needs, environmental sustainability and water quality requirements. Access to these areas is generally not allowed due to the following:

- The areas intercept sediments and nutrients/pollutants which pose safety risks to the public due to muddy clay, and
- They are used by aquatic birds and fish species as habitat, refuge and breeding areas.

#### Low Impact Activity Zone:

This zone act as a buffer between High Impact Activity Zones and Conservation Zones. Low Impact Activity Zone allows for low intensity activities, i.e. activities associated with little or no wake such as wind surfing, kayaking, swimming, rowing, sailing, paddle boating, float tubes, canoeing, angling, yachting, aquaculture and small scale fisheries.

#### High Impact Activity Zone:

This zone has the largest water surface area and is located where the reservoir is at its deepest. It caters for high impact activities associated with high speed, wake and noise activities such as motorised boating, house boating, water skiing, and para-sailing.

The water surface zoning colour coding means the following:

Colour Zone Description		
Red	Safety and Security Zone	
Green	Conservation Zone	
Sky Blue	Low Impact Activity Zone	
Dark Blue	High Impact Activity Zone	

 Table 12: Proposed Water Surface Zoning Description

Zone Name	Permissible Activities	Non-permissible Activities	Recommendation	
<ul> <li>Safety and Security Zone.</li> </ul>	<ul> <li>Alien invasive species clearing</li> <li>Management of dam infrastructure</li> <li>Management and maintenance activities by DWS and authorised personnel</li> </ul>	Public access	<ul> <li>Area should be demarcated by demarcation markers and AtoN</li> </ul>	
Conservation Zone.	Access is limited to conservation and research personnel	<ul> <li>Public activities in order to allow for:         <ul> <li>Undisturbed fish and bird breeding habitats</li> <li>To limit pollution potential.</li> </ul> </li> </ul>	<ul> <li>These areas should be demarcated by demarcation markers and AtoN.</li> <li>Strict management and control of these areas are necessary, especially with regards to unlawful net fishing.</li> </ul>	
Low Impact Activity Zone.	<ul> <li>Activities associated with no or little wakes, such as:         <ul> <li>Canoeing</li> <li>Boat angling</li> <li>Sailing</li> <li>Rowing</li> </ul> </li> <li>Development of sport with specific requirement for low wake water surface conditions</li> </ul>	<ul> <li>High impact activities such as         <ul> <li>Motorised boating</li> <li>Water Skiing</li> <li>House boats</li> <li>Para-sailing</li> <li>Kite-surfing</li> <li>Jet ski</li> </ul> </li> <li>No swimming in the dam</li> </ul>	<ul> <li>Area should be demarcated by demarcation markers and AtoN.</li> <li>Launching and mooring of vessels should take place at this zone.</li> <li>Recreational users will be responsible for the buoys system based in delineated zones while complying with DWS/SAMSA specifications.</li> </ul>	
• High Impact Activity Zone.	<ul> <li>Water-Skiing</li> <li>Motorised boating</li> <li>Water Skiing</li> <li>House boats</li> <li>Para-sailing</li> <li>Kite-surfing</li> <li>Jet ski</li> </ul>	<ul> <li>Low impact activities such as:         <ul> <li>Swimming</li> <li>Canoeing</li> <li>Sailing</li> <li>Rowing</li> <li>Float tubes</li> <li>Paddle boating</li> <li>Kayaks</li> </ul> </li> </ul>	<ul> <li>Area should be demarcated by demarcation makers and AtoN.</li> <li>All activities within the high impact zone shall take place beyond 70m from the shoreline.</li> <li>Activities within this zone must be evaluated to determine their impact on the water resources and other dam users before they are allowed into the dam</li> </ul>	



Figure 12: Proposed Surface Water Zoning Map

#### 4.2.2 Shoreline Zoning<sup>4</sup>

In addition to the water surface zoning, an integral part of the RMP is also shoreline zoning, which provides guidance on what recreational activities (if any) are permissible and not permissible on the land adjacent to the dam (DWS purchased boundary). The management zones include:

# <u>Safety and Security Zone (dam wall and associated DWS infrastructure):</u>

It is applicable to the area surrounding the dam wall and the outlet works. The extent of this zone is determined by DWS and shall not be less than 100m from the dam wall and downstream. This area is reserved for DWS management purposes.

Management of this zone is aimed at protecting the dam wall and outlet works, as well as to ensure the safety of the public and surrounding areas. This is a no-go zone to the public unless authorized.

#### Conservation / Low Density Activity Zone:

This zone consists of ecologically sensitive areas and areas with high biodiversity. It also includes the area around the inlets of the dam. Access to this area is limited to low impact activities such as hiking, bird watching, etc. This area is reserved to prevent ecological damage due to development activities hence high impact development not permitted.

#### Medium Density Activity Zone:

This area is reserved for small scale activities such as day visitors, picnic areas, shoreline fishing, camping (tent and caravan), braai facilities, swimming pools, ablution facilities and infrastructure for services.

#### High Density Activity Zone:

This area is reserved for large scale activities including chalets, recreational club houses, infrastructure for services, and Land Based Aquaculture.

#### **Community Resource Zone:**

This zone is for the sole beneficiation of the local communities in ensuring that their livelihood is maintained and improved. Activities include subsistence fishing, livestock watering points, small scale community gardens, etc.

The Shoreline zoning colour coding mean the following:

Colour	Zone Description			
Red	Safety and Security Zone			
Green	Conservation / Low Density Activity Zone			
Yellow	Medium Density Activity Zone:			
Orange	High Density Activity Zone			
Brown	Community Resource Zone			

<sup>&</sup>lt;sup>4</sup> Permanent structures within the purchase line are not allowed. All developments should be outside 1:100 year floodline.

Table 13: Proposed Shoreline Zoning Description

Zone Name	Permissible activities	Non-permissible Activities	Recommendation	
<ul> <li>Safety and Security Zone.</li> </ul>	<ul> <li>Fire management</li> <li>Alien invasive species clearing</li> <li>Management of dam infrastructure</li> <li>Management and maintenance activities by DWS and authorised personnel</li> </ul>	Public access	<ul> <li>Area should be demarcated by demarcation markers and AtoN.</li> <li>Access is limited to DWS and relevant authorised officials and the public (only to view the dam).</li> </ul>	
• Conservation / Low Density Activity Zone.	Bird watching	Development	• These zone should control access to ecological sensitive areas.	
Medium Density Activity Zone.	<ul> <li>Day visitors</li> <li>Picnics</li> <li>Camping</li> <li>Caravan Park</li> <li>Shoreline fishing</li> <li>Swimming pools</li> <li>small-scale fishery project</li> <li>Allowed facilities:         <ul> <li>Braai facilities</li> <li>Ablution facilities</li> </ul> </li> </ul>	<ul> <li>Permanent structures</li> <li>Accommodation facilities such as:         <ul> <li>Chalets</li> <li>Guesthouse</li> </ul> </li> </ul>	<ul> <li>All developments must be approved by DWS.</li> <li>Requirements of NWA and NEMA must be taken into account in all developments.</li> <li>Camping, birding, picnicking, bank angling and access to the water must be done in accordance to access agreements.</li> <li>Camping and picnicking is allowed only in designated areas.</li> <li>Noise level to be kept at a minimum.</li> <li>No littering at Camping and Picnic spots.</li> </ul>	
• High Density Activity Zone.	<ul> <li>Holiday/ tourism Accommodation facilities         <ul> <li>Chalets</li> <li>Guesthouse</li> <li>Resorts</li> </ul> </li> <li>Ablution facilities</li> <li>Washbay</li> <li>Swimming pools</li> </ul>	<ul> <li>Permanent structures</li> <li>Picnic</li> <li>Hiking</li> </ul>	<ul> <li>All developments must be approved by DWS.</li> <li>Requirements of NWA and NEMA must be taken into account in all developments.</li> <li>All developments should have an approved EMP to ensure construction does not impact on dam and must blend in with the natural environment.</li> <li>Noise levels to be kept at a minimum.</li> <li>No private slipways to be built without approval from DWS.</li> <li>Accommodation facilities should be built with wood, glass, steel or any other material which is not permanent.</li> </ul>	



Figure 13: Proposed Shoreline Zoning Map



#### Figure 14: Proposed Overall Zoning Map

#### 4.2.3 Carrying Capacity

In order to determine the degree or possible recreational use on the water surface, the Methodology for Carrying Capacity Assessment: Recreation Water Use (DWS 2003) was used as guideline to determine the level of activities that would be sustainable at Injaka Dam.

Carrying capacity for recreation provides a guideline to ensure that recreation at the dam is safe, that users do not feel crowded and that they enjoy the use of the dam for leisure activities.

There are three kinds of carrying capacity:

- Physical Carrying Capacity (PCC) this is the maximum number of users that can physically fit onto the water surface at any given time;
- Real Carrying Capacity (RCC) this is the maximum number of users that can use the resource once corrective factors that are unique to the dam are taken into account; and
- Effective (or permissible) Carrying Capacity (ECC) – this is the number of visitors that can use the resource, given the management capacity.

Each level constitutes a corrected capacity level of the preceding level. The PCC is always greater than the RCC, and the RCC is greater than the ECC, thus: **PCC > RCC and RCC \geq ECC.** 

The process of establishing the carrying capacity is normally determined through the following tasks:

- Analysis of recreation and water resource management policies;
- Analysis of objectives of the water resource;
- Analysis of current recreational water use;
- Definition, strengthening or modification of policies regarding recreational water use management;
- Identification of factors influencing recreational water use; and
- Determination of the recreational water use carrying capacity.

#### **Physical Carrying Capacity (PCC)**

#### PCC is calculated as PCC = A ×U/a ×Rf

- Where A = Area available for public use;
- **U/a** = area required for each user; and
- Rf = Rotation Factor (the number of visits per day)

**A** is calculated as the area of the water surface available for public use: **811.1** ha

The **U/A** = There is a range of literature regarding the area required for different recreational users.

The U/A used for the assessment is as follows: Craft	U/A (ha/craft)
Powerboats	4.0
Angling	3.0
Canoeing	1.0
Average	2.8

Based on the fact that most activities do not require much space, the average hectare per user is 2.8 ha (28 000 m<sup>2</sup>), the value of 5.0 ha (50 000 m<sup>2</sup>) can be acceptable area per user. This has been chosen in order to ensure that the dam is not overcrowded, as such impacting on the sense of the area.

The PCC for Injaka Dam can further be calculated as:

PCC =  $A \times U/a \times Rf$ =811.1 × 1/5 × 1 = 162 vessels

#### **Real Carrying Capacity**

The RCC takes factors into account that limits recreation. The limiting factors include:

- Safety Areas/ No go Zones (3.91 ha); and
- Conservation Area (142.27 ha).

The above factors results in 18.2% decrease in water surface available for recreation at the dam, therefore 82.5% of the surface area of the dam is still available for recreation.

RCC for Injaka Dam is therefore:

**RCC** = PCC ×  $(100 - Cf1)\% \times (100 - Cf2)\% \times (100 - Cfn)\%$ 

Where **Cf** = a corrective factor expressed as a percentage.

RCC = 162 × (100 – 18.2) %/100 = 133 vessels

#### **Effective Carrying Capacity**

The maximum number of visitors that a site can sustain, given the management capacity (MC) available. Currently there is no formal management structure in place, as such the ECC is 0. The ECC will be calculated after the proposed Institutional structure (as part of the RMP) have been implemented in order to manage the sustainable utilization of the dam for recreational purposes.

#### 4.3 STRATEGIC PLAN

The Strategic Plan is informed by the objectives identified by relevant Stakeholders and through research on possible opportunities for the dam.

The objectives were clearly defined and they effectively address the following questions:

- Objective (What do we want?);
- Motivation (Why do we want to achieve this?);Action Projects (How do we achieve this?); and
- Management Support (Who will be involved?).

**In Tables 12 – 17**, the Strategic Plan on how to achieve the identified objectives regarding the dam is outlined.

Table 14: Strategic Plan for KPA: 1: Resource Management (new)

KPA 1:Resource Management					
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)		
<ul> <li>Water Quality:</li> <li>To improve the water quality of Injaka Dam.</li> </ul>	<ul> <li>The Maviljan ponds (wastewater) which are upstream of the dam were leaking into the dam without being treated and that caused pollution and impacted on the water quality of the dam.</li> </ul>	<ul> <li>To upgrade the Maviljan waste water ponds in order to prevent untreated effluent to flow into the dam.</li> <li>The water upstream and downstream of the water resource must be regularly sampled to check any traits of pollution within the water resource since there is a wastewater treatment works upstream of the dam.</li> <li>Regular monitoring of the Maviljan Ponds (wastewater) for leaks that may result in raw sewage flowing into the dam.</li> <li>Proper waste management system at the dam.</li> <li>Implementation of Co-Operative Inland Waterways Safety Programme (CIWSP) at the dam.</li> </ul>	<ul> <li>BLM to facilitate the refurbishment of the ponds.</li> <li>The DWS (Regional Office-Water Quality and River Health Section) should monitor the water quality regularly to ensure its suitability for recreational activities.</li> <li>Involvement of DMC.</li> <li>DAFF and other government departments which are responsible for the water quality of the water resource including the BLM and ICUMA.</li> </ul>		
<ul> <li>Alien Invasive Vegetation:</li> <li>To have the dam and the surrounding environment free of Alien Vegetation in order to support the proposed recreational activities.</li> </ul>	There are scattered Alien Species around the dam including the <i>lantana</i> <i>camara, Melia azedarach</i> and Eucalyptus globulus plantation for commercial purposes, these alien species consume large quantities of water.	<ul> <li>Develop an inspection and cleaning mechanism such as wash bays to ensure that there is no spread of any alien aquatic species in the dam.</li> <li>Remove all invasive alien vegetation within the dam and re-establish the native species in the area.</li> </ul>	<ul> <li>DEA (Working for Water) and DWS.</li> <li>Involvement of DMC.</li> <li>Vessels and trailer wash bays must be constructed, as per the CIWSP best practice model, to eliminate the spread of aquatic alien vegetation when launching the vessel in the dam.</li> </ul>		

Table 15: Strategic Plan for KPA: 2 Resource Utilisation (new)

KPA 2: Resource Utilisation					
Objective (What do we want)	Motivation (Why do we want to achieve this)		Action Projects (How do we achieve this)		Management Support (Who will be involved)
Access: • To promote equitable access and use of the dam by the public.	<ul> <li>There is no designated access for the community at the dam and people are currently accessing the dam at any point around the dam.</li> <li>The public should be able to go to the dam and engage in recreational activities at an affordable price.</li> </ul>	•	The places which have been demarcated for public use should be developed. The community should be able to access the dam by low prices. There should be awareness programs to educate the local communities about the importance of safety measures around the dam basin.	•	<ul> <li>When reviewing the RMP the places</li> <li>which have been designated for</li> <li>public access will be reviewed and</li> <li>updated so that the community will</li> <li>have a proper access.</li> <li>DWS and DMC support is required</li> <li>to approve any kind of public</li> <li>access, use and development within</li> <li>the purchased boundary.</li> <li>DWS and DMC will have to work</li> <li>together when negotiating tariffs</li> <li>for the dam.</li> </ul>
<ul> <li>Recreational Facilities:</li> <li>To develop recreational facilities at the dam in order to attract tourists to the dam.</li> </ul>	<ul> <li>There is no designated access for the community at the dam and people are currently accessing the dam at any point around the dam.</li> <li>There are drowning incidents which have occurred in the past at the dam. The establishment of a swimming pool will help to educate the public particularly young children how to swim.</li> </ul>	•	The establishment of a swimming pool at the dam is safer as the dam is a home of dangerous animals. Erect warning boards at the dam warning the public about the dangerous animals in the dam e.g. crocodiles and hippopotamuses. There should be life guards checking young people who are swimming at the pool to prevent drowning incidents.	•	DMC The swimming pool will require life guards for the safety of the public and tourists. Local communities can be trained to be life guards.

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW

Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
<ul> <li>Small Scale Fishery:</li> <li>Introduction of Small Scale Fishery.</li> </ul>	<ul> <li>Currently there are unlawful fishing at the dam where people use nets to harvest fish.</li> <li>Small scale fisheries will make an important contribution to nutrition, food security, sustainable livelihoods and poverty alleviation to the local community.</li> </ul>	<ul> <li>Preserve the core habitats for nesting, resting, feeding and breeding of fish within the inlets.</li> <li>Management authority must develop a communication signage in order to effectively inform different angling groups about the dam fishing rules.</li> <li>To establish dam fishing rules.</li> <li>Appoint Safety Officer that will monitor compliance of the fishing rules.</li> </ul>	<ul> <li>Different government departments such as DWS, DEA, DAFF, should work together in order to assess the viability and possibility of introducing the small scale fishery.</li> </ul>
<ul> <li>Safety:</li> <li>To promote public safety when engaging in recreational activities at the dam.</li> </ul>	<ul> <li>There were drowning incidents which have occurred at the dam and also criminal activities, where a person was beaten and dumped in the dam.</li> <li>The community should be safe when engaging in recreational activities at the dam.</li> </ul>	<ul> <li>Educate the local communities about the importance of safety measures around the dam in order to curb criminal activities like mugging and stealing at the dam.</li> <li>The skipper should have a skipper's license and leave voyage details for safety purposes prior to conducting boat trips.</li> <li>Implementation of the standardised and harmonised AtoN and Demarcation Markers.</li> <li>There should also be a policing forum, formed by the community to eradicate criminal activities in the area.</li> <li>There should be Rules and Regulations for people who are accessing the dam for recreational use regarding safety.</li> </ul>	<ul> <li>DWS to appoint a safety personnel at the dam to ensure public safety.</li> <li>Community to work with SAPS to form a policing forum.</li> </ul>

Table 16: Strategic Plan for KPA 3: Benefit Flow Management (new)

KPA 3: Benefit Flow Management				
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)	
Community Empowerment: • To uplift the local economy through community empowerment.	<ul> <li>Tourism sector have been identified as a vehicle for skills development, job creation, Broad-based Black Economic Empowerment, etc. it is imperative that the local communities derive benefit from recreational activities conducted at the dam.</li> </ul>	<ul> <li>Implement Skills Development Programmes where opportunities exist.</li> <li>Provision of suitable day visit areas within the dam as majority of communities enjoy visiting the dam during weekends. This will reduce littering at the dam as there will be good waste management facilities onsite.</li> <li>To subsidise the recreational events in order to accommodate all classes.</li> </ul>	<ul> <li>Relevant Municipal Departments such as Local Economic Development (LED) must be involved.</li> <li>Involvement of the DMC as well as other relevant Government Departments that deal with community social welfare, sport and education should be involved in making sure that the community is participating as well as benefiting from the dam through recreational activities.</li> </ul>	
<ul> <li>Institutional Arrangement:</li> <li>To review the institutional structure which was formed in 2007.</li> </ul>	• There is no effective institutional structure at the dam for recreational use.	<ul> <li>The institutional structure must have representatives from all key stakeholders.</li> <li>The role and responsibilities of the role players must be clearly defined and understood.</li> </ul>	<ul> <li>DWS (Institutional Establishment sector) and key stakeholders.</li> </ul>	

 Table 17: Strategic Plan for KPA 1: Resource Management (old)

KPA 1: Resource Management					
Objective (What do we want)	Motivation (Why do we want to achieve this)		Action Projects (How do we achieve this)		Management Support (Who will be involved)
<ul> <li>Maintenance:</li> <li>To maintain and enhance the system's present character and to minimize impacts on the natural landscape.</li> </ul>	<ul> <li>Major parts of the dam are natural environment with forestry and agricultural land.</li> </ul>	•	Undertake a biodiversity assessment and prepare a Biodiversity Management Plan (BMP).	•	DWS, DMC, DEA and other local conservation initiatives.
<ul> <li><u>Carrying Capacity:</u></li> <li>To determine sustainable carrying capacity for resource</li> </ul>	<ul> <li>Carrying capacity is an effective management tool to control access, utilization and</li> </ul>	•	Prepare Resource Quality Objectives (RQOs) and set carrying capacities for resource utilisation.	•	The involvement of the relevant industry with regard to user

#### INJAKA DAM RESOURCE MANAGEMENT PLAN REVIEW

KPA 1: Resource Management				
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)	
utilization and limits of acceptable change and to accordingly monitor utilization impacts.	development within the dam basin.		<ul> <li>experience and other aspects such as safety is imperative.</li> <li>Environmental and other planning institutions including relevant government departments need to be consulted when establishing density controls.</li> </ul>	
<ul> <li>Sustainable Utilisation:</li> <li>To provide sustainable utilization of the natural resources of Injaka Dam in a manner that optimizes income and other benefits without compromising the primary and secondary use.</li> </ul>	<ul> <li>There are no recreational activities which are currently taking place at the dam.</li> </ul>	<ul> <li>To ensure that people who are engaging in recreational activities at the dam are aware of the rules and regulation at the dam.</li> <li>To appoint an enforcement personnel to ensure that people are following rules and regulations at the dam.</li> </ul>	• The DMC and DWS regional office.	
<ul> <li>Research and Tourist Experience:</li> <li>To research, document and protect the cultural resources within the area.</li> <li>To document the history of the Injaka Dam, specifically the history of the farm and valley.</li> <li>As part of the tourist experience, to provide insight into the establishment and purposes of the dam, and the cultural heritage resources associated with the area.</li> </ul>	<ul> <li>The cultural and heritage of the area must be preserved for future generation.</li> <li>The three (3) Traditional Authorities which are leading where the dam is located, should be taken into consideration and involved when reviewing the RMP for Injaka Dam.</li> </ul>	<ul> <li>Formalise a co-operation agreement and relationships with the relevant provincial heritage authority and the South African Heritage Resource Authority (SAHRA).</li> <li>Identify cultural projects in the region and possible links with Injaka Dam.</li> <li>A data base of cultural resources will be compiled by properly trained and accredited researchers and continuously updated by the management authority, based on cultural mapping techniques.</li> <li>Both tangible and intangible cultural resources will be incorporated into the visitor experience programme at Injaka Dam ensuring an authentic and culturally appropriate experience</li> </ul>	<ul> <li>The established institutional structure and SAHRA must work together to uncover the cultural resources.</li> </ul>	

 Table 18: Strategic Plan for KPA 2: Resource Utilisation (old)

KPA 2: Resource Utilisation					
Objective (What do we want)	Motivation (Why do we want to achieve this)		Action Projects (How do we achieve this)		Management Support (Who will be involved)
Tourism Development:• To optimise tourism and economic development opportunities in an equitable manner based on the 	• There are no recreational activities currently happening at the dam.	•	To demarcate public access controlled area at the dam for the public and tourists to enjoy the dam. To market Injaka Dam in order to attract tourists.	•	Established institutional structure (DMC) and DWS to ensure that there is a good marketing strategy for the dam.
<ul> <li>Needs and Equitable Access:</li> <li>To address the needs of the public in an appropriate and equitable manner;</li> <li>To encourage outsourcing of public access facilities and to define operating and safety rules in co-operation with contractors and operators.</li> </ul>	There are no controlled public access to the dam.	•	Procure public access contracts. Conclude access agreements for private use and organised events. Prepare operating rules and set carrying capacities based on the water resource and the environment. Develop a permit system for subsistence fishing together with the relevant Provincial environmental authority. Compile and implement an awareness strategy.	•	The established institutional structure such as DMC and DWS.
<ul> <li>Marketing:</li> <li>To develop a unique branding for the dam that can be well marketed.</li> </ul>	<ul> <li>There is no marketing for the dam as there are no recreational activities which are currently taking place.</li> </ul>	•	To control and limit infrastructural development through authorizations and conditions attached to agreements and contracts. To ensure consistency and accuracy regarding the content of marketing material and programs. To optimize economic and social benefits locally and for the region through the establishment awareness regarding the dam, its products, and programs.	•	Established institutional structure, DWS-regional office and the Implementing Agency.

Table 19: Strategic Plan for KPA 3: Benefit Flow Management (old)

KPA 3: Benefit Flow Management			
Objective (What do we want)	Motivation (Why do we want to achieve this)	Action Projects (How do we achieve this)	Management Support (Who will be involved)
<ul> <li>Benefits:         <ul> <li>To facilitate the establishment of a Benefit Flow Institution (BFI) or appropriate institutional arrangements consisting of representatives from neighboring communities and selected external persons as a vehicle to oversee and distribute community benefits equitably and fairly.</li> <li>To illustrate the benefits accruing from sustainable management, utilization and development.</li> </ul> </li> </ul>	<ul> <li>There is no institutional structure in place at the dam.</li> </ul>	<ul> <li>The institutional structure must be representative of all key stakeholders.</li> <li>The role and responsibilities of the role players must be clearly defined and understood.</li> <li>Facilitate the establishment of a BFI, specifically recognising existing structures, institutions and organisations.</li> <li>Compile an awareness strategy and action plan.</li> <li>Compile a database of local service providers in conjunction with Local Government.</li> </ul>	DWS (Institutional Establishment sector), DMC.
<ul> <li>Empowerment Programmes:</li> <li>To stimulate local economic activities through training, capacitation and empowerment programmes.</li> </ul>	<ul> <li>There is a high rate of unemployment in Bushbuckridge, people would benefit from this RMP through community empowerment and skills transfer when this RMP is implemented.</li> </ul>	<ul> <li>Strengthen community participation and beneficiation.</li> <li>The community benefits which might arise from the dam should be given to the local community.</li> <li>There should be youth development programs for the local youth, to educate and equip them with the necessary skills to be involved in tourism or to open their own businesses.</li> </ul>	<ul> <li>Involvement of the DMC as well as other relevant Government Departments that deal with community social welfare, sport and education should be involved in making sure that the community is participating as well as benefiting from the dam through recreational activities.</li> </ul>

#### 4.4 FINANCIAL PLAN

The RMP provides guidance on cost recovery mechanisms to ensure the sustained and improved management of the dam. There are opportunities for PPPs which could further unlock the economic potential of the dam. PPPs allows for DWS to make State Assets such as GWWs available to private parties who wish to engage in tourism related commercial operations (DWAF, 2009). PPPs should be established as per Regulation 16 of the National Treasury.

The dam is a state asset and as such all profits generated from the recreational use, should also be used to further develop the dam. People should not be denied access to the dam. All fees associated with the usage of the dam for recreation should take into account the socio-economic status of the users. The access fees should make a provision for equitable access. The information acquired from the RMP will be used to produce the Business Plan based on the action projects for each objective as stipulated under the Strategic Plan. However, many of the identified objectives are not of commercial nature and as such these noneconomic objectives will not feature in the BP.

The BP provides a good description of possible economic recreational activities and the methods that can be used or enhanced to achieve the ultimate vision and the key objectives of Injaka Dam RMP. It also describes the financial management and operational requirements to implement the Objectives of the RMP

The BP will include a Financial Plan (FP) which will facilitate the implementation of the RMP by providing implementation program cost estimate for all possible economic recreational activities.

### WAY FORWARD

Once the RMP and its BP are approved by the Minister of Water and Sanitation, it will be published in the Government Gazette as a regulation in terms of Section 26 of the NWA.

#### **Review of RMP**

According to DWAF (2006), the RMP is reviewed and updated every five (5) years to ensure that the management objectives remains relevant and management actions are continually improved. The BP is updated annually. **Figure 14** illustrates the RMP and BP review framework.



Figure 15: RMP and BP and Review Framework

### CONCLUSIONS

This RMP documents the challenges that exists within the Injaka Dam that can significantly impact on the utilisation and management of the dam and its surroundings for recreational purposes. Such factors include legal, biophysical, socio-economic, and hydrological as well as access to the resource. These factors will assist DWS with the most appropriate approach to ascertain that the issues are addressed before the implementation of the RMP.

The RMP report aimed to effectively manage the dam and the surrounding State Land. The report consists of three (3) plans namely: Institutional Plan, Zonal Plan and Strategic Plan. The **Institutional Plan** provide the proposed institutional structure for the effective management of dam, whereas **Zonal Plan** provides guidance on potential activities as well as suitable location for each identified activities and the **Strategic Plan** explains how the identified objectives will be addresses and ultimately achieve the overall vison for the dam.

Moreover, the RMP promotes community participation and beneficiation, through Stakeholders engagement which were conducted to obtain common key objectives to be met by the RMP. The vision of the dam was formulated from the key common objectives identified by Stakeholders. Based on the strategic objectives identified for Injaka Dam, a BP has been developed to describe the manner in which the potential recreational activities are to be financially resourced.

In addition, including the RMP in the Local Initiatives such as IDPs, LED, etc. can ensure effective co-operative governance as well as to provide necessary support with regards to the use of dam for recreational purposes. Undertaken in this manner, it is believed that the potential of the water resource can be optimally unlocked in a sustainable and equitable manner.

### REFERENCES

**Department of Water Affairs and Forestry**, (1998), *National Water Act. 1998. Act No 36 of 1998*, Pretoria, South Africa.

**Department of Water Affairs and Forestry**, (2001) *Generic Public Participation Guidelines*.

**Department of Water Affairs & Forestry**, (2004), Internal Strategic Perspective (ISP) – Inkomati Water Management Area.

**Department of Water Affairs and Forestry**, (2006), *Recreational Water Use Manual Guidelines, First Release, South Africa*.

**Department of Water and Forestry**, (2007), Resource Management Plan for Injaka Dam.

**Department of Water Affairs**, (2014), *Terms of Reference- Development of Resource Management Plan for prioritized Governmental Water works*.

**Bushbuckridge Local Municipality,** (2013), Final Integrated Development Plan 2013/14.

Http://www.mobilitate.co.za

**Statistics South Africa,** (2011), *Statistics Release, Census*.

# APPENDICES