

AGRI SA WATER CONFERENCE

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Water Resource Protection and the Impact on Beneficial Use

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Contents

- Introduction
- The Reserve
- Classification
- Ecological Water Requirements
- Effect on Beneficial Use
- Case study
- Conclusion

Introduction

- The Water Act (Act 54 of 1956) only protected the resource in terms of water quality
- If a Government Water Control Area was proclaimed, this was to protect the rights of riparian owners
- Need to protect the resource was realised some time ago and some research commenced in the late 1980s
- The National Water Act (Act 36 of 1998) defined the Reserve and requires this to be given effect
- Aim is to ensure sustainable development

The Reserve

- The Reserve is that quantity (and associated quality) of water that should be left in the resource in order to ensure its continued well-being
- The Reserve is not aimed at the aquatic ecology, but at the users
- A healthy river provides goods and services that have value, the aquatic ecology is the indicator
- The quantity of water that represents the Reserve depends on the condition in which the river is to be maintained, not necessarily pristine

Classification

- Classification will be used to determine the balance between beneficial use and resource protection
- Regulations will be published shortly for the seven step process
- Classification will result in Class 1, 2 or 3
- Class 1 favours the resource, while Class 3 favours beneficial use
- There is a minimum ecological condition that has to be maintained, irrespective of the Class
- Classification requires extensive stakeholder participation

Ecological Water Requirements

- Considers four aspects:
 - Fish
 - Invertebrates
 - Riparian vegetation
 - Habitat (including river morphology)
- Requirements depend on the ecological management category (EMC)
- Can be four functional categories: A, B, C or D
- Two other Categories (E and F) are used to indicate severely modified systems that are not sustainable
- The closer to natural (Category A), the more water is required for the Reserve

Flow Requirements

- Minimum flows are determined by the most critical aspect, mostly fish
- Considers flow depth mostly, but also velocity
- Must mimic natural variations in flow
- Two conditions are considered:
 - Maintenance flows (60th percentile)
 - Drought flows (95th percentile)
- Flows are quantified by means of a rule table
- The Reserve is set as a percentage of the natural flow

Rule Table

Reserve

Month	% Point									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	99%
Oct	23.582	23.409	23.017	22.206	20.695	18.205	14.692	10.646	7.187	5.579
Nov	40.773	40.53	40.024	39.022	37.146	33.87	28.66	21.421	13.352	8.275
Dec	44.964	44.697	44.139	43.037	40.971	37.365	31.63	23.66	14.778	9.189
Jan	64.694	62.593	60.442	57.885	54.356	48.296	40.902	30.627	19.174	11.968
Feb	121.472	112.6431	4.733	97.086	88.705	74.551	62.602	45.998	27.49	15.845
Mar	67.494	65.426	63.278	60.679	57.033	50.767	42.978	32.154	20.09	12.499
Apr	42.526	42.204	41.474	39.964	37.15	32.514	25.971	18.438	11.997	9.002
May	35.182	34.921	34.327	33.1	30.813	27.046	21.729	15.607	10.373	7.939
Jun	29.095	28.88	28.39	27.378	25.491	22.384	17.997	12.947	8.629	6.622
Jul	26.227	26.033	25.593	24.683	22.987	20.192	16.248	11.707	7.825	6.02
Aug	23.67	23.498	23.108	22.3	20.794	18.315	14.815	10.785	7.34	5.738
Sep	21.669	21.512	21.155	20.417	19.042	16.777	13.579	9.898	6.751	5.287

Natural Duration curves

Month	% Point									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	99%
Oct	95.687	75.272	57.072	52.561	46.02	38.079	33.506	30.282	27.285	22.073
Nov	446.268	316.3541	92.5171	30.542	120.108	91.413	75.53	62.768	48.513	29.201
Dec	450.563	335.7592	96.0532	39.145	159.928	147.609	124.754	88.415	70.606	42.498
Jan	908.192	600.1093	56.9052	40.289	222.511	179.148	136.115	114.526	93.009	68.742
Feb	991.262	697.8353	66.4332	34.366	196.606	133.189	117.049	103.268	83.863	71.204
Mar	549.371	420.0963	39.0662	36.982	156.622	115.226	100.734	83.904	79.99	57.196
Apr	243.677	217.7521	65.0681	31.531	115.309	104.195	88.106	73.686	57.278	50.645
May	139.297	125.2481	10.88	87.354	80.33	76.076	66.816	55.538	47.473	44.599
Jun	100.641	87.2	75.829	65.91	62.027	57.464	49.378	44.949	39.233	36.647
Jul	78.929	69.834	60.832	55.311	49.419	47.277	45.032	39.346	33.31	31.055
Aug	63.633	55.043	50.964	46.196	41.633	38.8	36.761	33.877	30.128	27.491
Sep	77.786	50.068	43.414	39.923	38.223	35.381	32.435	28.84	26.481	23.227

Effect on beneficial Use

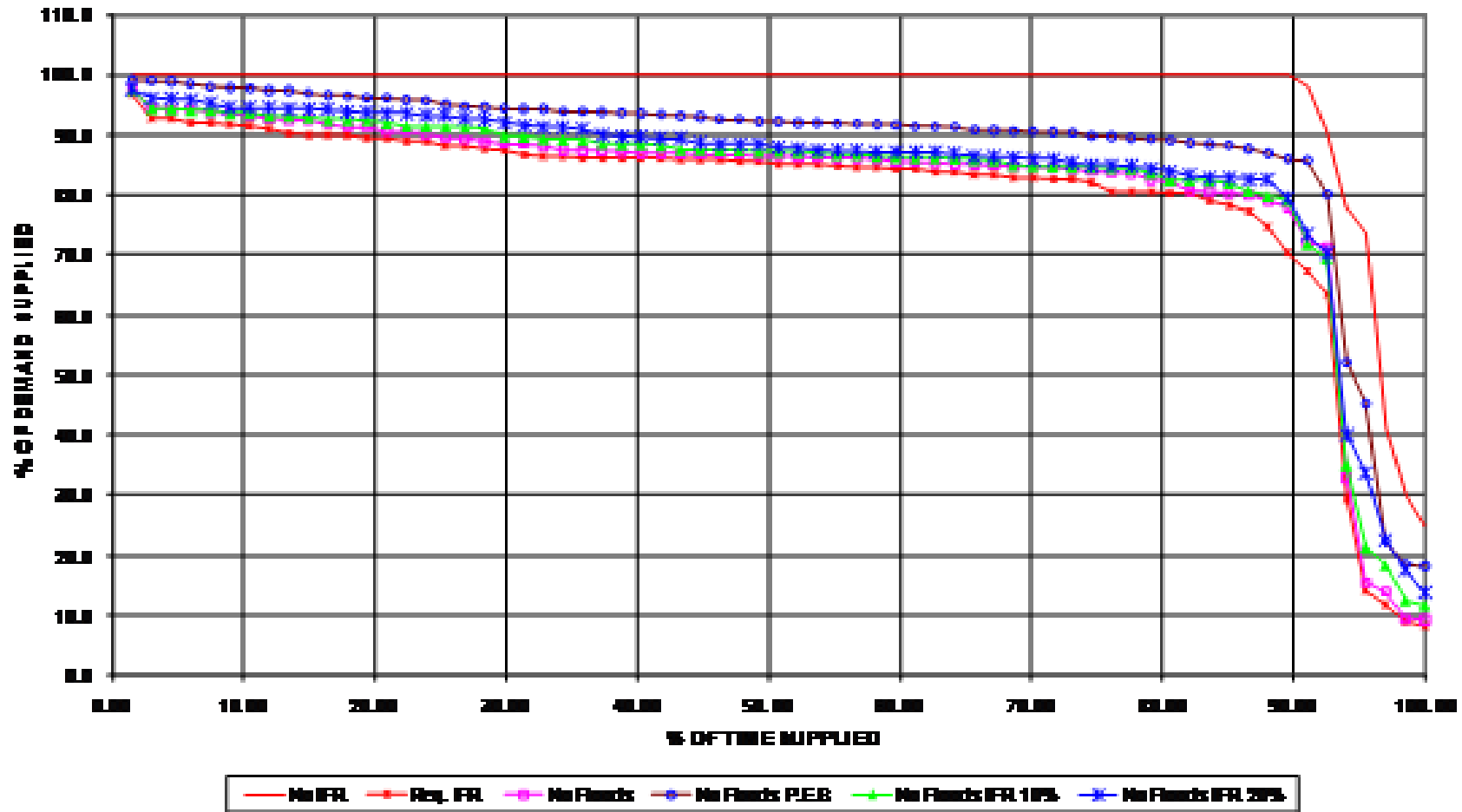
- Need to consider two aspects:
 - Quantity allocated
 - Assurance of supply
- Assurance of supply has two aspects:
 - Percentage time of full supply
 - Minimum percentage of full supply
- For agriculture percentage time for full supply will typically be 70%, and the minimum supply 70%
- Competition for water occurs when the flow is below average
- Impact of the Reserve is therefore in terms of assurance of supply

Case Study

Six Scenarios were analysed:

1. Base scenario (business as usual)
2. Full Reserve implemented (makes provision for some improvement in resource condition)
3. Full reserve, but no floods
4. No floods, drought flows 10% of time
5. No floods, drought flows 20% of time
6. No improvement in resource condition

Results



Conclusion

- Protection of the resource is required by law
- Implementation in stressed systems will require a reduction in the allocation for beneficial use, or at the very least a decrease in the assurance of supply
- This will have to be over the entire catchment, and not only from the dam supply
- The DWA will implement the Reserve by issuing licences with specific conditions
- Compliance monitoring and enforcement presents a challenge

The End

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