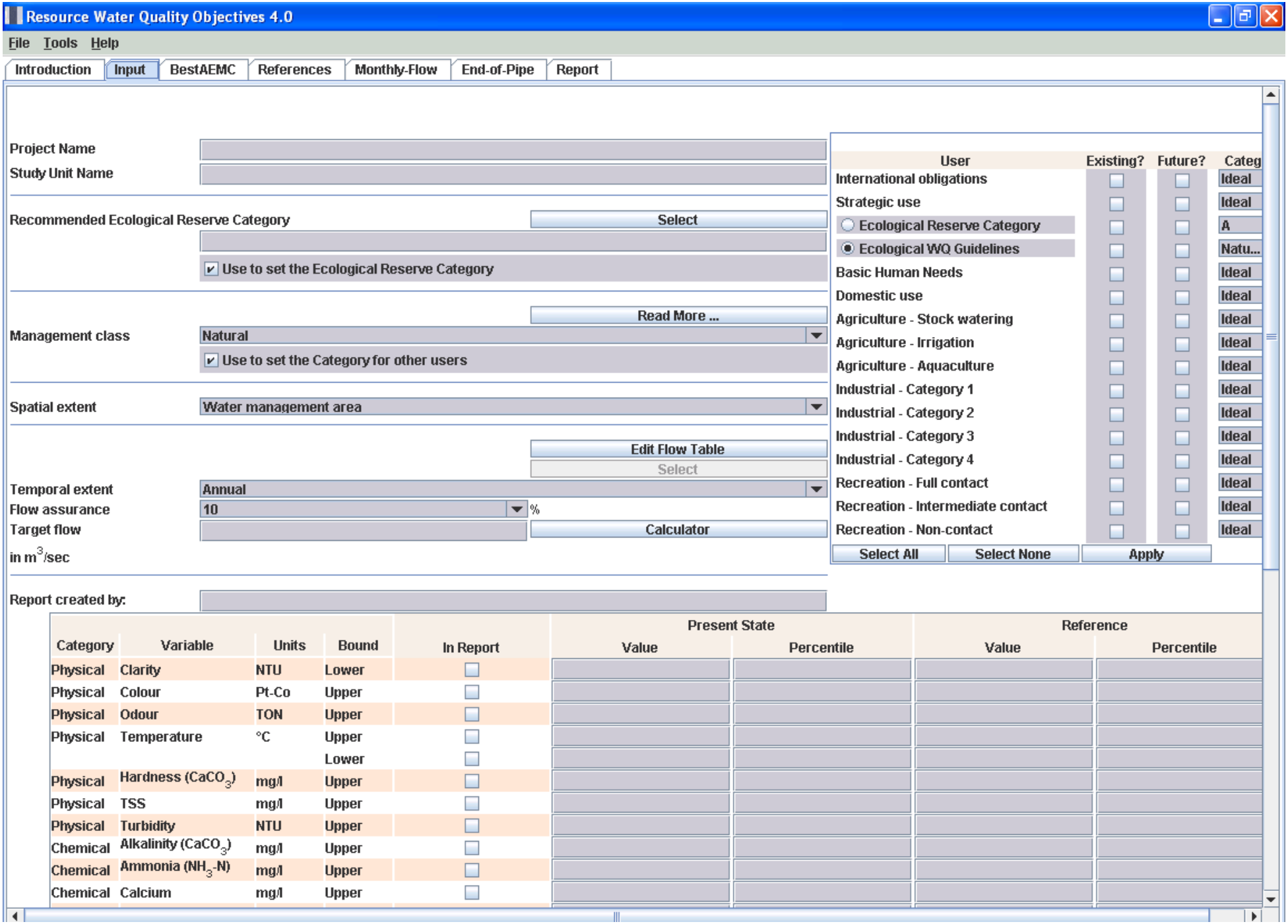
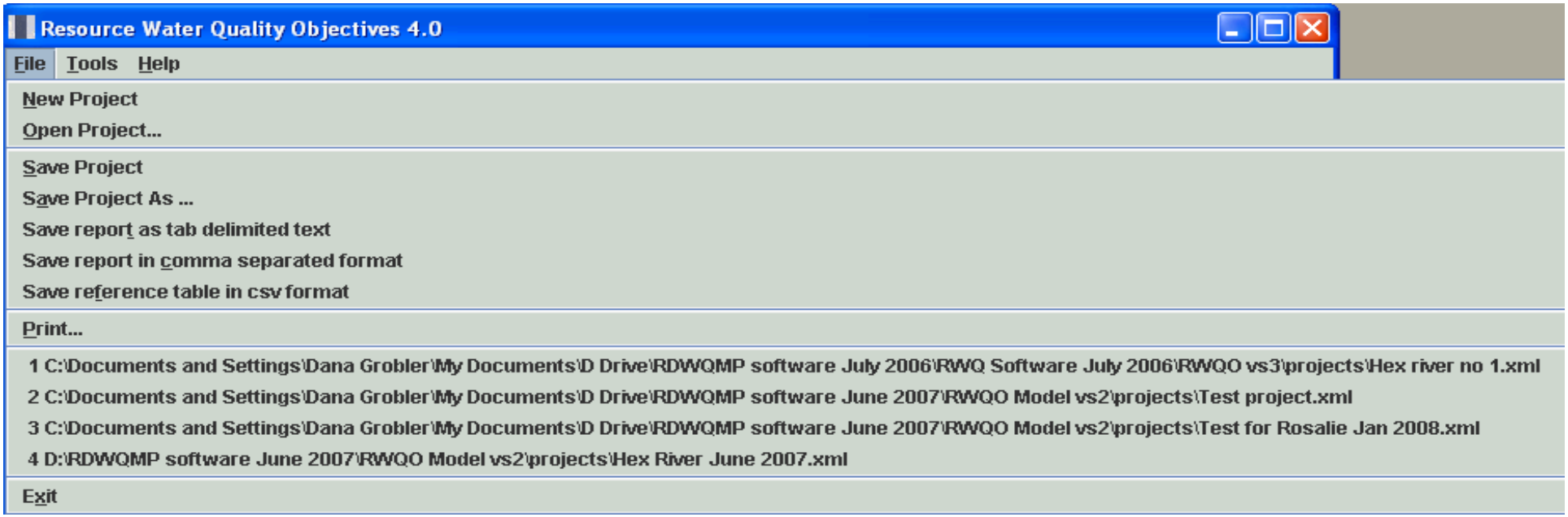
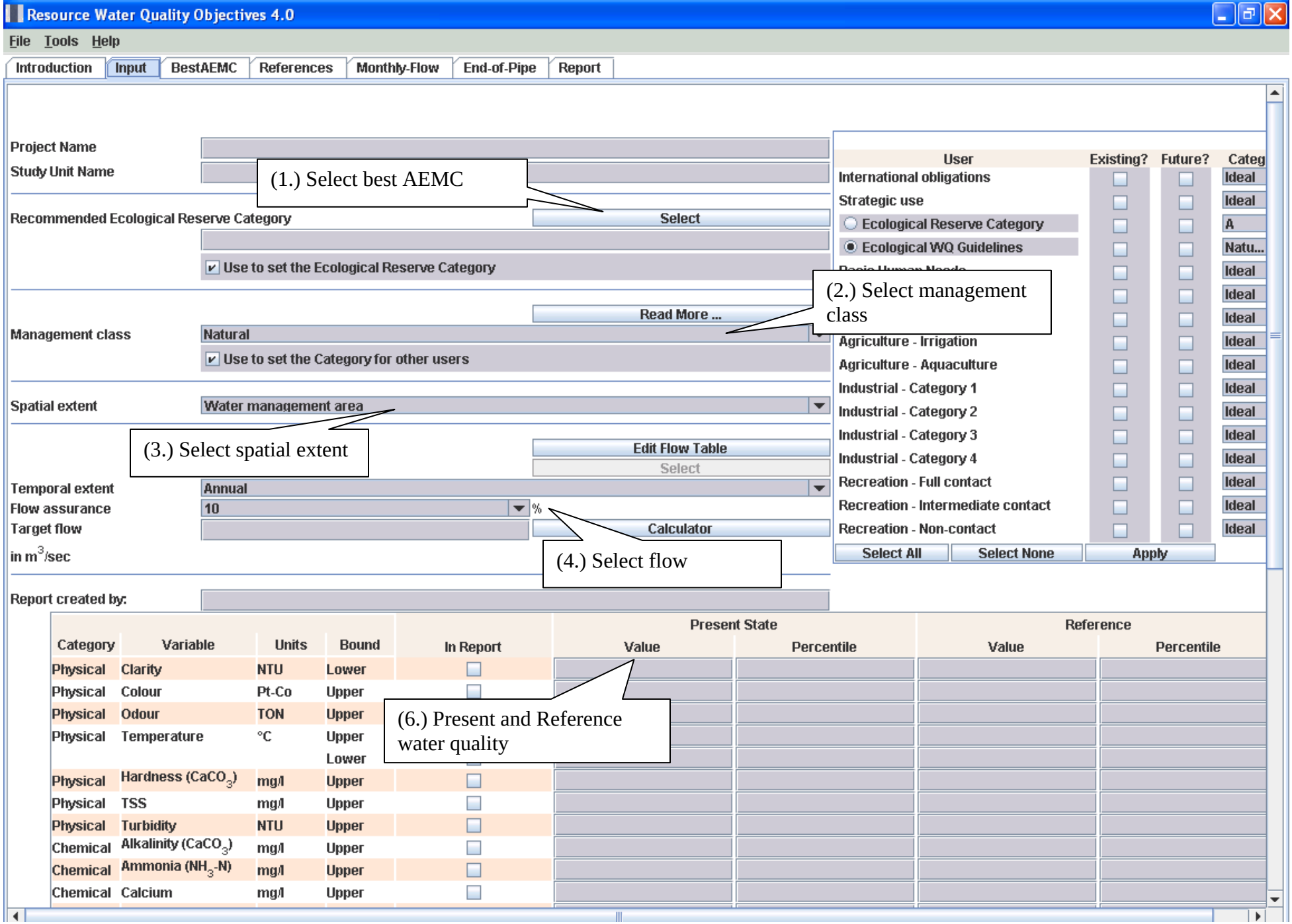
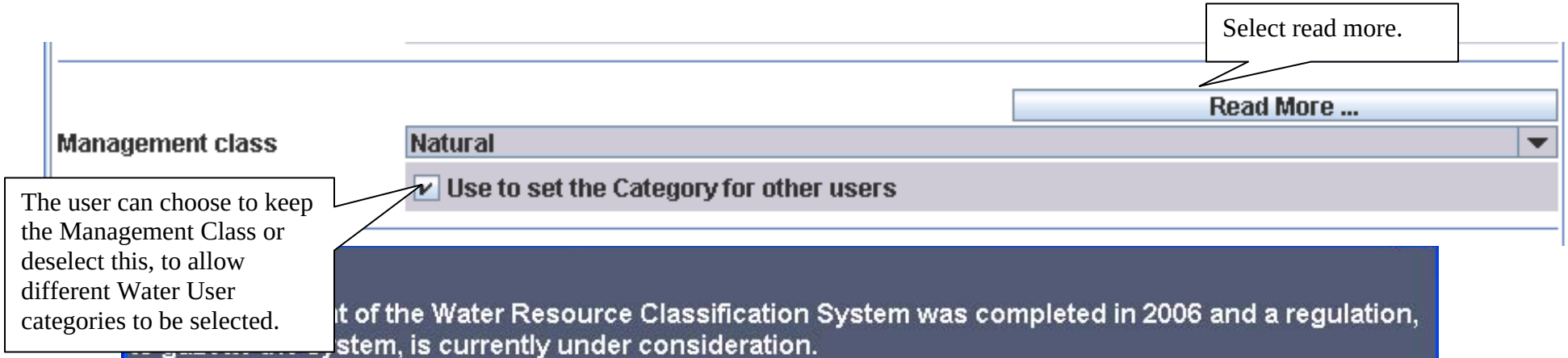

Resource Water Quality Objectives 4.0
File Tools Help
Introduction Input BestAEMC References Monthly-Flow End-of-Pipe Report
Project Name
Study Unit Name
Recommended Ecological Reserve Category
Select
Use to set the Ecological Reserve Category
Read More ...
Management class
Natural
Use to set the Category for other users
Spatial extent
Water management area
Edit Flow Table
Select
Temporal extent
Annual
Flow assurance
10
%
Target flow
Calculator
in m3/sec
Report created by:
User
Existing?
Future?
Categ
International obligations
Strategic use
Ecological Reserve Category
A
Ecological WQ Guidelines
Natu...
Basic Human Needs
Domestic use
Agriculture - Stock watering
Agriculture - Irrigation
Agriculture - Aquaculture
Industrial - Category 1
Industrial - Category 2
Industrial - Category 3
Industrial - Category 4
Recreation - Full contact
Recreation - Intermediate contact
Recreation - Non-contact
Ideal
Select All
Select None
Apply
Category
Variable
Units
Bound
In Report
Present State
Value
Percentile
Reference
Value
Percentile
Physical Clarity NTU Lower
Physical Colour Pt-Co Upper
Physical Odour TON Upper
Physical Temperature °C Upper
Lower
Physical Hardness (CaCO3) mg/l Upper
Physical TSS mg/l Upper
Physical Turbidity NTU Upper
Chemical Alkalinity (CaCO3) mg/l Upper
Chemical Ammonia (NH3-N) mg/l Upper
Chemical Calcium mg/l Upper


Resource Water Quality Objectives 4.0
File
Tools
Help
New Project
Open Project...
Save Project
Save Project As ...
Save report as tab delimited text
Save report in comma separated format
Save reference table in csv format
Print...
1 C:\Documents and Settings\Dana Grobler\My Documents\D Drive\RDWQMP software July 2006\RWQ Software July 2006\RWQO vs3\projects\Hex river no 1.xml
2 C:\Documents and Settings\Dana Grobler\My Documents\D Drive\RDWQMP software June 2007\RWQO Model vs2\projects\Test project.xml
3 C:\Documents and Settings\Dana Grobler\My Documents\D Drive\RDWQMP software June 2007\RWQO Model vs2\projects\Test for Rosalie Jan 2008.xml
4 D:\RDWQMP software June 2007\RWQO Model vs2\projects\Hex River June 2007.xml
Exit


Resource Water Quality Objectives 4.0
File Tools Help
Introduction Input BestAEMC References Monthly-Flow End-of-Pipe Report
Project Name
Study Unit Name
(1.) Select best AEMC
Recommended Ecological Reserve Category
Select
Use to set the Ecological Reserve Category
Read More ...
Management class
Natural
(2.) Select management class
Use to set the Category for other users
Spatial extent
Water management area
(3.) Select spatial extent
Edit Flow Table
Select
Temporal extent
Annual
Flow assurance
10
%
Target flow
Calculator
in m3/sec
(4.) Select flow
Report created by:
User
Existing?
Future?
Categ
International obligations
Strategic use
Ecological Reserve Category
Ecological WQ Guidelines
Agriculture - Irrigation
Agriculture - Aquaculture
Industrial - Category 1
Industrial - Category 2
Industrial - Category 3
Industrial - Category 4
Recreation - Full contact
Recreation - Intermediate contact
Recreation - Non-contact
Ideal
Natu...
A
Select All
Select None
Apply
Category
Variable
Units
Bound
In Report
Present State
Value
Percentile
Reference
Value
Percentile
Physical Clarity NTU Lower
Physical Colour Pt-Co Upper
Physical Odour TON Upper
Physical Temperature °C Upper
Lower
Physical Hardness (CaCO3) mg/l Upper
Physical TSS mg/l Upper
Physical Turbidity NTU Upper
Chemical Alkalinity (CaCO3) mg/l Upper
Chemical Ammonia (NH3-N) mg/l Upper
Chemical Calcium mg/l Upper
(6.) Present and Reference water quality



The user can choose to keep the Management Class or deselect this, to allow different Water User categories to be selected.

t of the Water Resource Classification System was completed in 2006 and a regulation, stem, is currently under consideration.

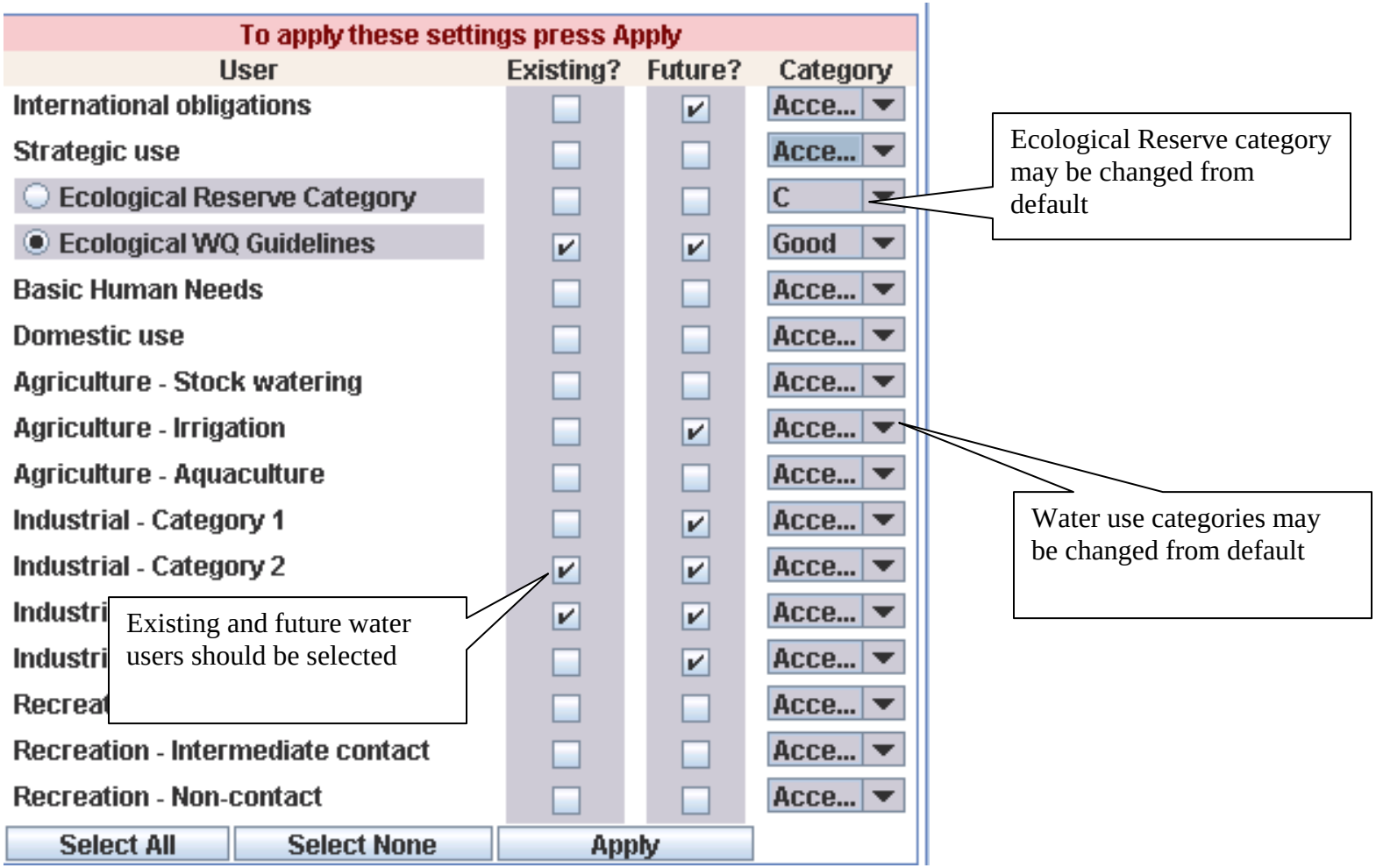
The WRCS is proposing 3 management classes:

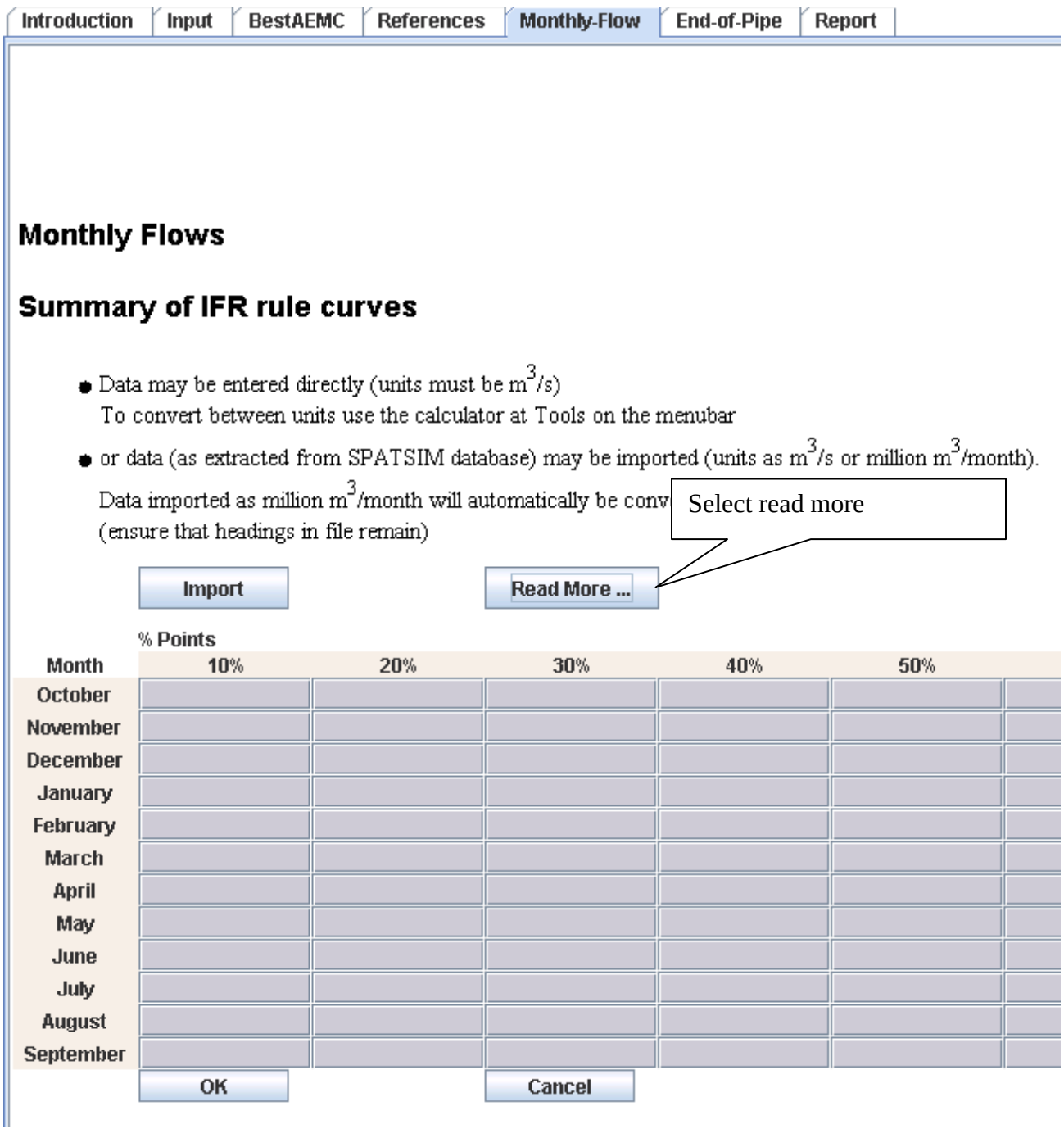
Natural/Minimally used (Class I)- The configuration of ecological categories of the water resources within a catchment results in an overall water resource condition that is minimally altered from its pre-development condition or;
Moderately used/impacted (Class II) - The configuration of ecological categories of the water resources within a catchment results in an overall water resource condition that is moderately altered from its pre-development condition or;
Heavily used/impacted (Class III) - The configuration of ecological categories for the water resources within a catchment results in an overall water resource condition that is significantly altered from its pre-development condition.

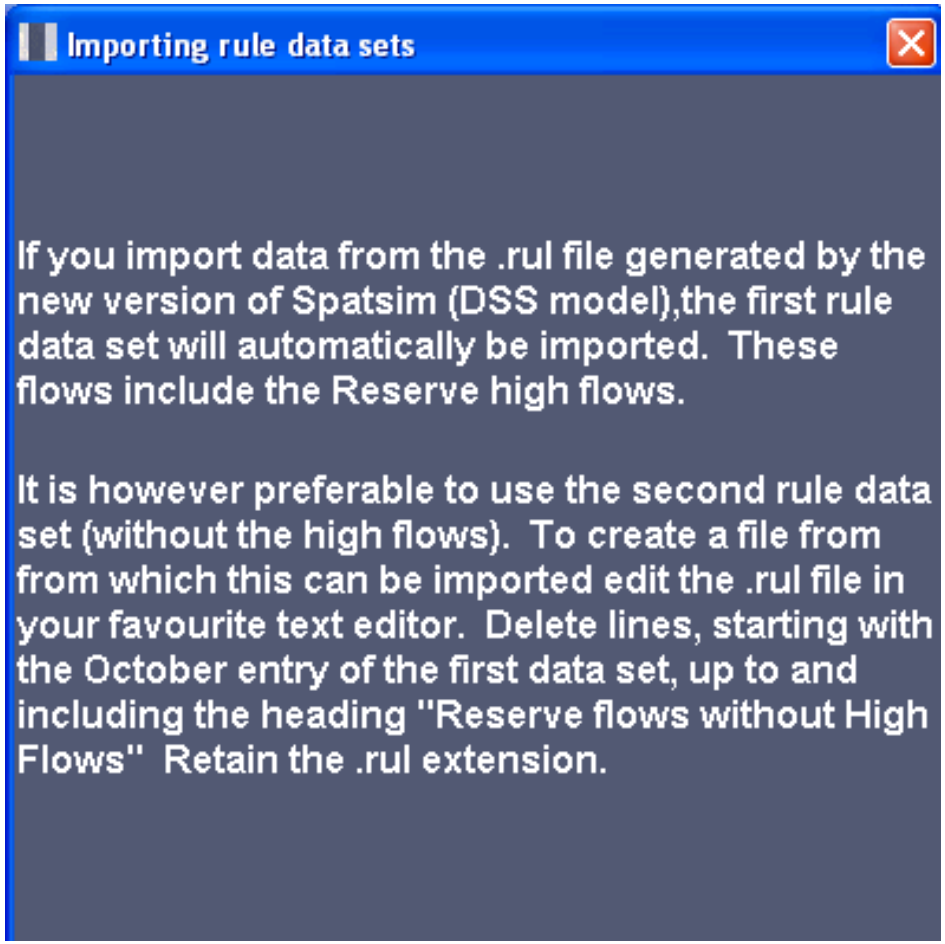
Upon selecting a management class (and upon ticking the button to allow the automatic selection of category for water users) the model will automatically assign the following water use requirements to the users:

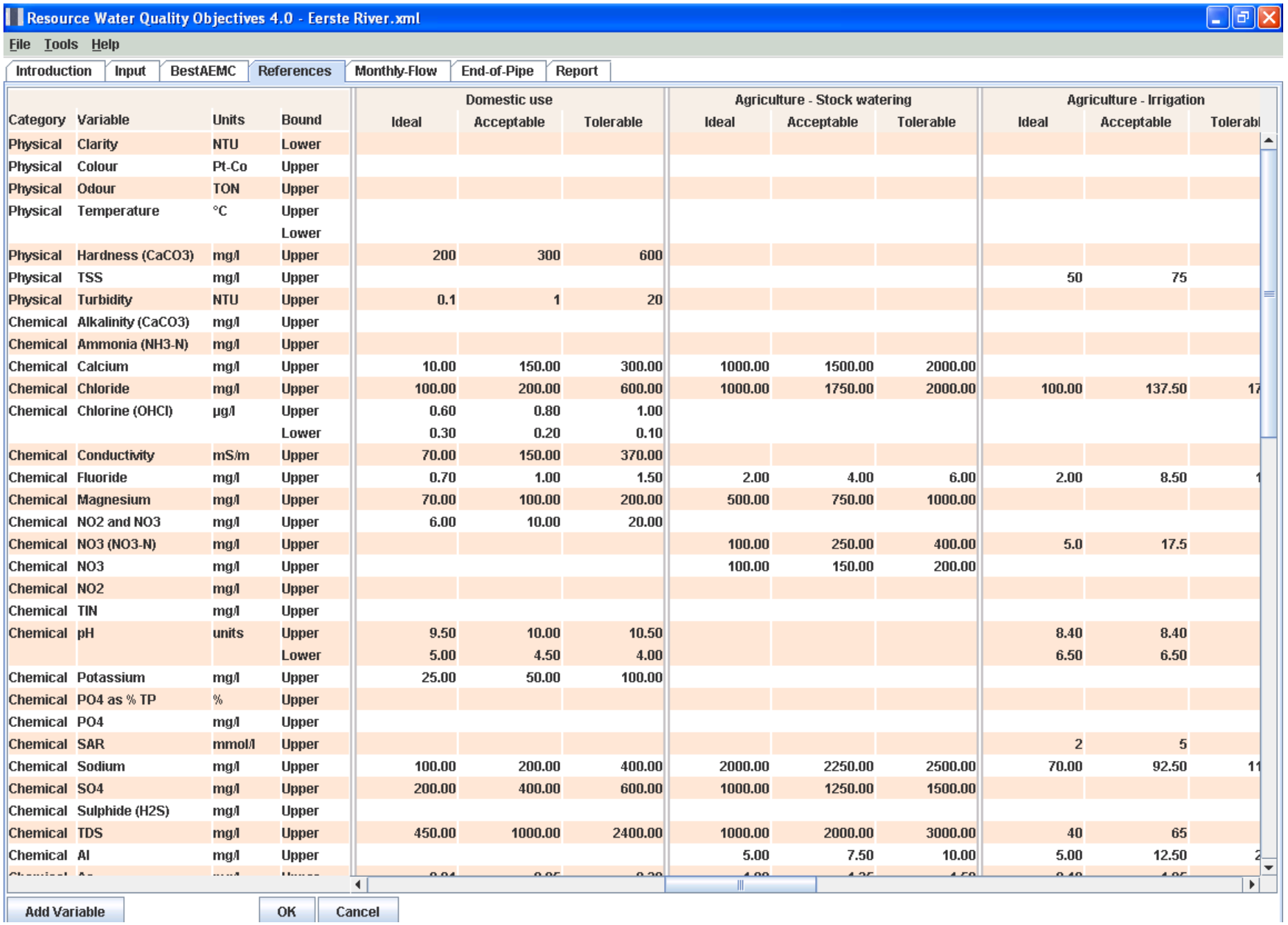
Natural – Ideal (Natural will be selected for the Ecological Water Quality Guidelines)
Moderately used – Acceptable (Good will be selected for the Ecological Water Quality Guidelines)
Heavily used – Tolerable (Fair will be selected for the Ecological Water Quality Guidelines)

The automated selection can be edited by selecting from the drop down menu for each user group.

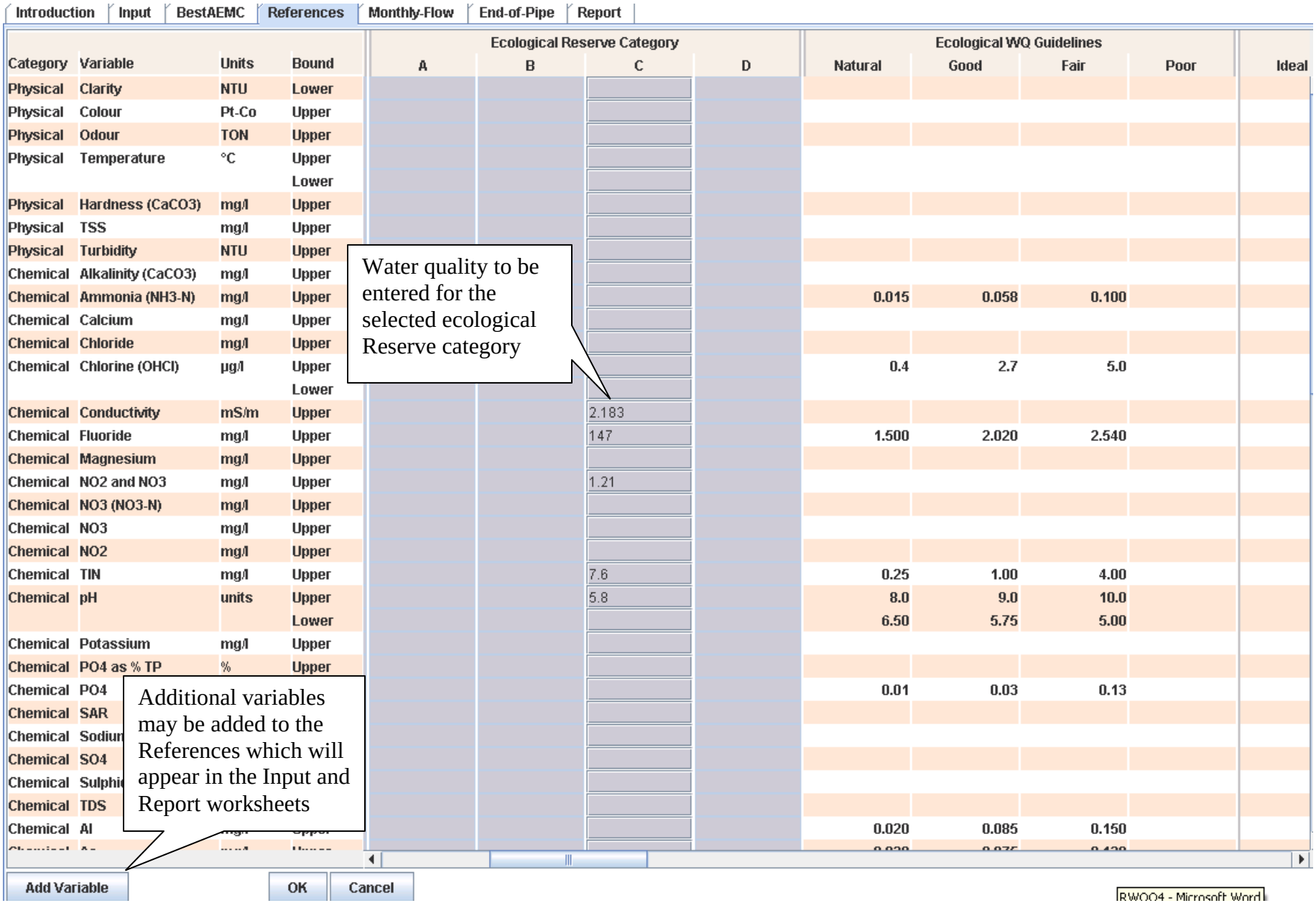

To apply these settings press Apply
User
Existing?
Future?
Category
International obligations
Strategic use
Ecological Reserve Category
Ecological WQ Guidelines
Basic Human Needs
Domestic use
Agriculture - Stock watering
Agriculture - Irrigation
Agriculture - Aquaculture
Industrial - Category 1
Industrial - Category 2
Industri
Industri
Recreat
Recreation - Intermediate contact
Recreation - Non-contact
Acce...
C
Good
Select All
Select None
Apply
Ecological Reserve category may be changed from default
Water use categories may be changed from default
Existing and future water users should be selected

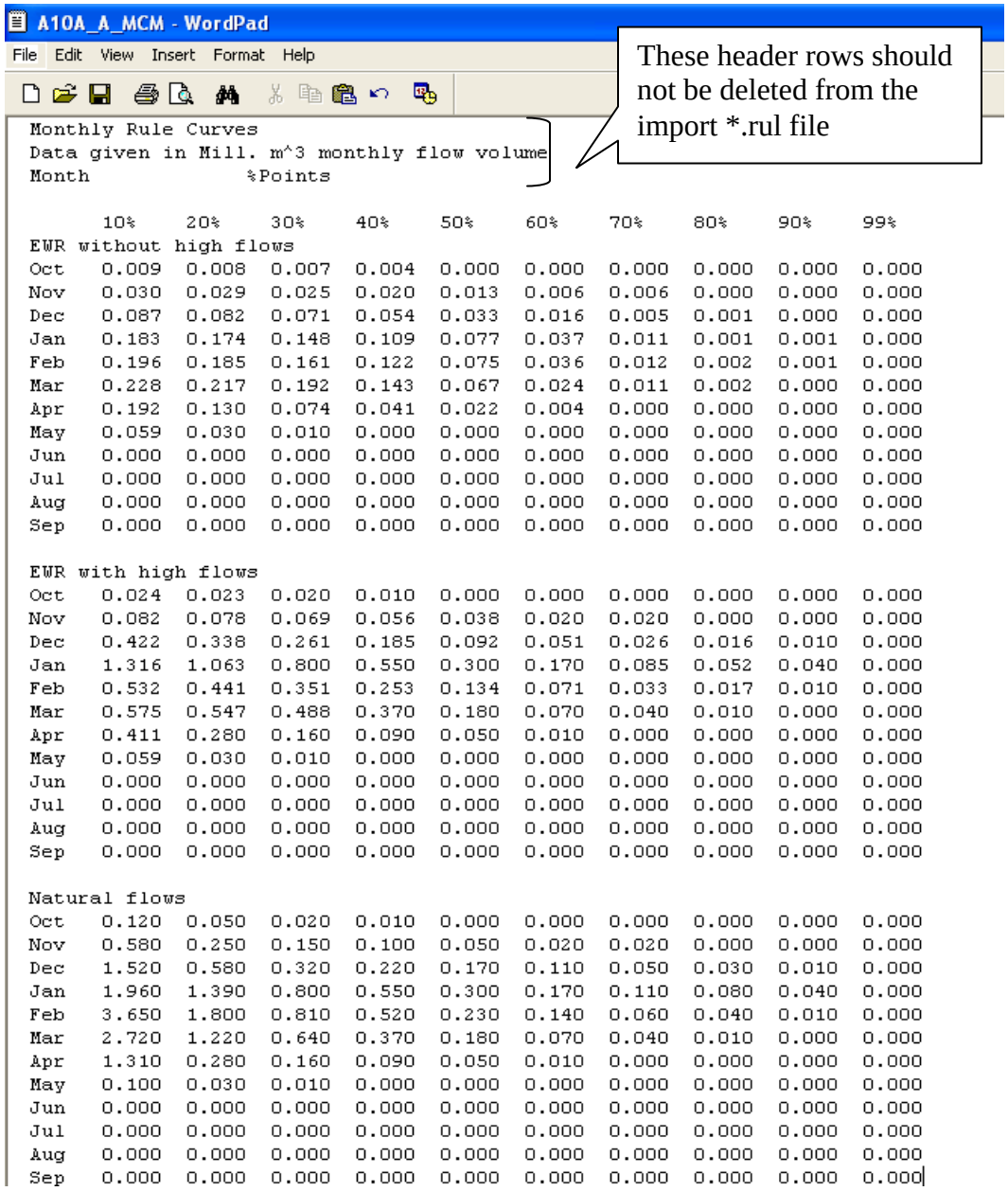

Introduction
Input
BestAEMC
References
Monthly-Flow
End-of-Pipe
Report
Monthly Flows
Summary of IFR rule curves
Data may be entered directly (units must be m3/s)
To convert between units use the calculator at Tools on the menubar
or data (as extracted from SPATSIM database) may be imported (units as m3/s or million m3/month).
Data imported as million m3/month will automatically be conv
(ensure that headings in file remain)
Select read more
Import
Read More ...
% Points
Month
10%
20%
30%
40%
50%
October
November
December
January
February
March
April
May
June
July
August
September
OK
Cancel


Importing rule data sets
If you import data from the .rul file generated by the new version of Spatsim (DSS model),the first rule data set will automatically be imported. These flows include the Reserve high flows.
It is however preferable to use the second rule data set (without the high flows). To create a file from from which this can be imported edit the .rul file in your favourite text editor. Delete lines, starting with the October entry of the first data set, up to and including the heading "Reserve flows without High Flows" Retain the .rul extension.



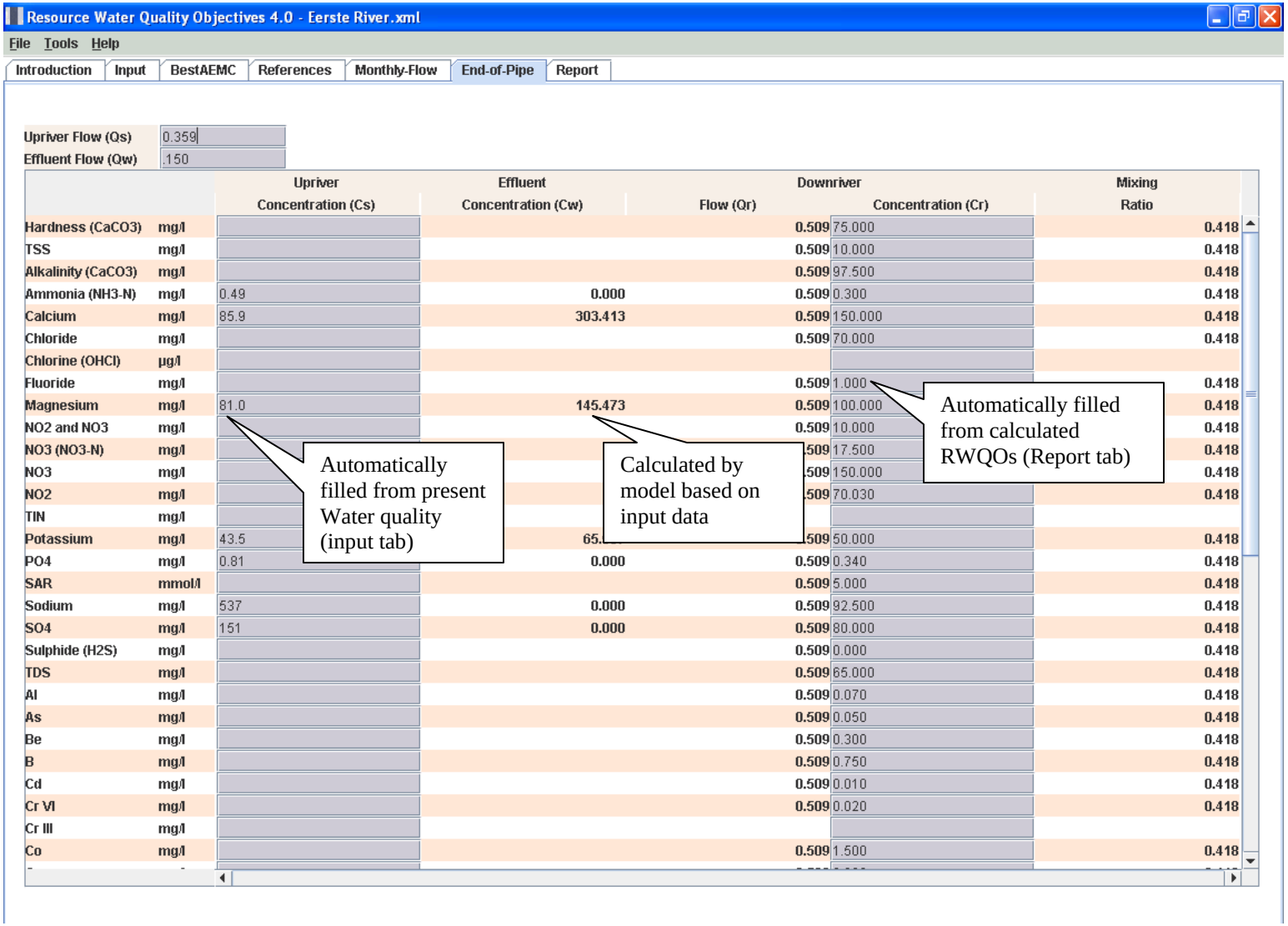
				Domestic use			Agriculture - Stock watering			Agriculture - Irrigation		
Category	Variable	Units	Bound	Ideal	Acceptable	Tolerable	Ideal	Acceptable	Tolerable	Ideal	Acceptable	Tolerabl
Physical	Clarity	NTU	Lower									
Physical	Colour	Pt-Co	Upper									
Physical	Odour	TON	Upper									
Physical	Temperature	°C	Upper									
			Lower									
Physical	Hardness (CaCO3)	mg/l	Upper	200	300	600						
Physical	TSS	mg/l	Upper							50	75	
Physical	Turbidity	NTU	Upper	0.1	1	20						
Chemical	Alkalinity (CaCO3)	mg/l	Upper									
Chemical	Ammonia (NH3-N)	mg/l	Upper									
Chemical	Calcium	mg/l	Upper	10.00	150.00	300.00	1000.00	1500.00	2000.00			
Chemical	Chloride	mg/l	Upper	100.00	200.00	600.00	1000.00	1750.00	2000.00	100.00	137.50	17
Chemical	Chlorine (OHCl)	µg/l	Upper	0.60	0.80	1.00						
			Lower	0.30	0.20	0.10						
Chemical	Conductivity	mS/m	Upper	70.00	150.00	370.00						
Chemical	Fluoride	mg/l	Upper	0.70	1.00	1.50	2.00	4.00	6.00	2.00	8.50	1
Chemical	Magnesium	mg/l	Upper	70.00	100.00	200.00	500.00	750.00	1000.00			
Chemical	NO2 and NO3	mg/l	Upper	6.00	10.00	20.00						
Chemical	NO3 (NO3-N)	mg/l	Upper				100.00	250.00	400.00	5.0	17.5	
Chemical	NO3	mg/l	Upper				100.00	150.00	200.00			
Chemical	NO2	mg/l	Upper									
Chemical	TIN	mg/l	Upper									
Chemical	pH	units	Upper	9.50	10.00	10.50				8.40	8.40	
			Lower	5.00	4.50	4.00				6.50	6.50	
Chemical	Potassium	mg/l	Upper	25.00	50.00	100.00						
Chemical	PO4 as % TP	%	Upper									
Chemical	PO4	mg/l	Upper									
Chemical	SAR	mmol/l	Upper							2	5	
Chemical	Sodium	mg/l	Upper	100.00	200.00	400.00	2000.00	2250.00	2500.00	70.00	92.50	11
Chemical	SO4	mg/l	Upper	200.00	400.00	600.00	1000.00	1250.00	1500.00			
Chemical	Sulphide (H2S)	mg/l	Upper									
Chemical	TDS	mg/l	Upper	450.00	1000.00	2400.00	1000.00	2000.00	3000.00	40	65	
Chemical	Al	mg/l	Upper				5.00	7.50	10.00	5.00	12.50	2

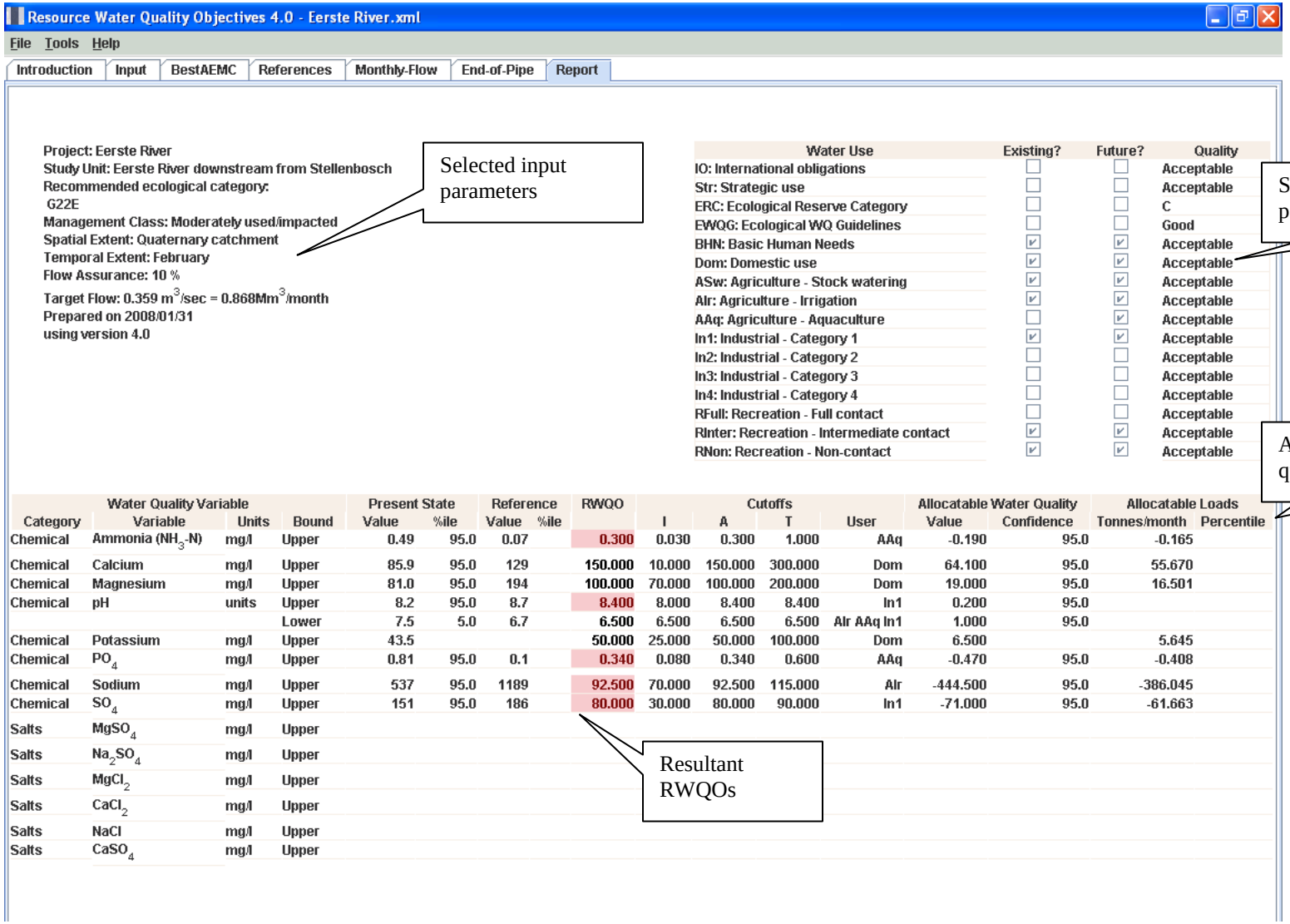

Introduction
Input
BestAEMC
References
Monthly-Flow
End-of-Pipe
Report
Ecological Reserve Category
Ecological WQ Guidelines
Category
Variable
Units
Bound
A
B
C
D
Natural
Good
Fair
Poor
Ideal
Physical Clarity NTU Lower
Physical Colour Pt-Co Upper
Physical Odour TON Upper
Physical Temperature °C Upper
Lower
Physical Hardness (CaCO3) mg/l Upper
Physical TSS mg/l Upper
Physical Turbidity NTU Upper
Chemical Alkalinity (CaCO3) mg/l Upper
Chemical Ammonia (NH3-N) mg/l Upper 0.015 0.058 0.100
Chemical Calcium mg/l Upper
Chemical Chloride mg/l Upper
Chemical Chlorine (OHCl) µg/l Upper 0.4 2.7 5.0
Lower
Chemical Conductivity mS/m Upper 2.183
Chemical Fluoride mg/l Upper 147 1.500 2.020 2.540
Chemical Magnesium mg/l Upper
Chemical NO2 and NO3 mg/l Upper 1.21
Chemical NO3 (NO3-N) mg/l Upper
Chemical NO3 mg/l Upper
Chemical NO2 mg/l Upper
Chemical TIN mg/l Upper 7.6 0.25 1.00 4.00
Chemical pH units Upper 5.8 8.0 9.0 10.0
Lower 6.50 5.75 5.00
Chemical Potassium mg/l Upper
Chemical PO4 as % TP % Upper
Chemical PO4 0.01 0.03 0.13
Chemical SAR
Chemical Sodiu
Chemical SO4
Chemical Sulphi
Chemical TDS
Chemical Al Upper 0.020 0.085 0.150
Water quality to be entered for the selected ecological Reserve category
Additional variables may be added to the References which will appear in the Input and Report worksheets
Add Variable
OK
Cancel
RWQO4 - Microsoft Word



Monthly Rule Curves
Data given in Mill. m^3 monthly flow volume
Month %Points

	10%	20%	30%	40%	50%	60%	70%	80%	90%	99%
EWR without high flows										
Oct	0.009	0.008	0.007	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Nov	0.030	0.029	0.025	0.020	0.013	0.006	0.006	0.000	0.000	0.000
Dec	0.087	0.082	0.071	0.054	0.033	0.016	0.005	0.001	0.000	0.000
Jan	0.183	0.174	0.148	0.109	0.077	0.037	0.011	0.001	0.001	0.000
Feb	0.196	0.185	0.161	0.122	0.075	0.036	0.012	0.002	0.001	0.000
Mar	0.228	0.217	0.192	0.143	0.067	0.024	0.011	0.002	0.000	0.000
Apr	0.192	0.130	0.074	0.041	0.022	0.004	0.000	0.000	0.000	0.000
May	0.059	0.030	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
EWR with high flows										
Oct	0.024	0.023	0.020	0.010	0.000	0.000	0.000	0.000	0.000	0.000
Nov	0.082	0.078	0.069	0.056	0.038	0.020	0.020	0.000	0.000	0.000
Dec	0.422	0.338	0.261	0.185	0.092	0.051	0.026	0.016	0.010	0.000
Jan	1.316	1.063	0.800	0.550	0.300	0.170	0.085	0.052	0.040	0.000
Feb	0.532	0.441	0.351	0.253	0.134	0.071	0.033	0.017	0.010	0.000
Mar	0.575	0.547	0.488	0.370	0.180	0.070	0.040	0.010	0.000	0.000
Apr	0.411	0.280	0.160	0.090	0.050	0.010	0.000	0.000	0.000	0.000
May	0.059	0.030	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natural flows										
Oct	0.120	0.050	0.020	0.010	0.000	0.000	0.000	0.000	0.000	0.000
Nov	0.580	0.250	0.150	0.100	0.050	0.020	0.020	0.000	0.000	0.000
Dec	1.520	0.580	0.320	0.220	0.170	0.110	0.050	0.030	0.010	0.000
Jan	1.960	1.390	0.800	0.550	0.300	0.170	0.110	0.080	0.040	0.000
Feb	3.650	1.800	0.810	0.520	0.230	0.140	0.060	0.040	0.010	0.000
Mar	2.720	1.220	0.640	0.370	0.180	0.070	0.040	0.010	0.000	0.000
Apr	1.310	0.280	0.160	0.090	0.050	0.010	0.000	0.000	0.000	0.000
May	0.100	0.030	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000


Resource Water Quality Objectives 4.0 - Eerste River.xml
File Tools Help
Introduction Input BestAEMC References Monthly-Flow End-of-Pipe Report
Upriver Flow (Qs) 0.359
Effluent Flow (Qw) .150
Upriver
Effluent
Downriver
Mixing
Concentration (Cs)
Concentration (Cw)
Flow (Qr)
Concentration (Cr)
Ratio
Hardness (CaCO3) mg/l 0.509 75.000 0.418
TSS mg/l 0.509 10.000 0.418
Alkalinity (CaCO3) mg/l 0.509 97.500 0.418
Ammonia (NH3-N) mg/l 0.49 0.000 0.509 0.300 0.418
Calcium mg/l 85.9 303.413 0.509 150.000 0.418
Chloride mg/l 0.509 70.000 0.418
Chlorine (OHCl) µg/l
Fluoride mg/l 0.509 1.000 0.418
Magnesium mg/l 81.0 145.473 0.509 100.000 0.418
NO2 and NO3 mg/l 0.509 10.000 0.418
NO3 (NO3-N) mg/l 17.500 0.418
NO3 mg/l 150.000 0.418
NO2 mg/l 70.030 0.418
TIN mg/l
Potassium mg/l 43.5 0.509 50.000 0.418
PO4 mg/l 0.81 0.000 0.509 0.340 0.418
SAR mmol/l 0.509 5.000 0.418
Sodium mg/l 537 0.000 0.509 92.500 0.418
SO4 mg/l 151 0.000 0.509 80.000 0.418
Sulphide (H2S) mg/l 0.509 0.000 0.418
TDS mg/l 0.509 65.000 0.418
Al mg/l 0.509 0.070 0.418
As mg/l 0.509 0.050 0.418
Be mg/l 0.509 0.300 0.418
B mg/l 0.509 0.750 0.418
Cd mg/l 0.509 0.010 0.418
Cr VI mg/l 0.509 0.020 0.418
Cr III mg/l
Co mg/l 0.509 1.500 0.418
Automatically filled from present Water quality (input tab)
Calculated by model based on input data
Automatically filled from calculated RWQOs (Report tab)


Resource Water Quality Objectives 4.0 - Eerste River.xml
File Tools Help
Introduction Input BestAEMC References Monthly-Flow End-of-Pipe Report
Project: Eerste River
Study Unit: Eerste River downstream from Stellenbosch
Recommended ecological category:
G22E
Management Class: Moderately used/impacted
Spatial Extent: Quaternary catchment
Temporal Extent: February
Flow Assurance: 10 %
Target Flow: 0.359 m3/sec = 0.868Mm3/month
Prepared on 2008/01/31
using version 4.0
Selected input parameters
Water Use Existing? Future? Quality
IO: International obligations Acceptable
Str: Strategic use Acceptable
ERC: Ecological Reserve Category C
EWQG: Ecological WQ Guidelines Good
BHN: Basic Human Needs Acceptable
Dom: Domestic use Acceptable
ASw: Agriculture - Stock watering Acceptable
Alr: Agriculture - Irrigation Acceptable
AAq: Agriculture - Aquaculture Acceptable
In1: Industrial - Category 1 Acceptable
In2: Industrial - Category 2 Acceptable
In3: Industrial - Category 3 Acceptable
In4: Industrial - Category 4 Acceptable
RFull: Recreation - Full contact Acceptable
RInter: Recreation - Intermediate contact Acceptable
RNon: Recreation - Non-contact Acceptable
Selected input parameters
Allocatable water quality
Water Quality Variable Present State Reference RWQO Cutoffs Allocatable Water Quality Allocatable Loads
Category Variable Units Bound Value %ile Value %ile I A T User Value Confidence Tonnes/month Percentile
Chemical Ammonia (NH3-N) mg/l Upper 0.49 95.0 0.07 0.300 0.030 0.300 1.000 AAq -0.190 95.0 -0.165
Chemical Calcium mg/l Upper 85.9 95.0 129 150.000 10.000 150.000 300.000 Dom 64.100 95.0 55.670
Chemical Magnesium mg/l Upper 81.0 95.0 194 100.000 70.000 100.000 200.000 Dom 19.000 95.0 16.501
Chemical pH units Upper 8.2 95.0 8.7 8.400 8.000 8.400 8.400 In1 0.200 95.0
Lower 7.5 5.0 6.7 6.500 6.500 6.500 6.500 Alr AAq In1 1.000 95.0
Chemical Potassium mg/l Upper 43.5 50.000 25.000 50.000 100.000 Dom 6.500 5.645
Chemical PO4 mg/l Upper 0.81 95.0 0.1 0.340 0.080 0.340 0.600 AAq -0.470 95.0 -0.408
Chemical Sodium mg/l Upper 537 95.0 1189 92.500 70.000 92.500 115.000 Alr -444.500 95.0 -386.045
Chemical SO4 mg/l Upper 151 95.0 186 80.000 30.000 80.000 90.000 In1 -71.000 95.0 -61.663
Salts MgSO4 mg/l Upper
Salts Na2SO4 mg/l Upper
Salts MgCl2 mg/l Upper
Salts CaCl2 mg/l Upper
Salts NaCl mg/l Upper
Salts CaSO4 mg/l Upper
Resultant RWQOs