

# ***NIH\_ReSyP* - A Reservoir Systems Package Developed at NIH**



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# Salient Features of *NIH\_ReSyP*

- **A number of programs developed for reservoir analysis problems merged to make ReSyP.**
- **Core in Fortran; forms and chores in Visual BASIC.**
- **Runs under Windows environment.**
- **Does not need any specific software or hardware.**
- **Provides a user-friendly environment.**
- **Results are presented in tabular and graphical form.**
- **Online Help is available.**
- **Results including graphs generated can be used in other applications by cut-copy-paste.**
- **Data can be prepared in MS-Excel and pasted in input forms or vice-versa.**

# Opening Banner of *NIH\_ReSyP*

## NIH\_Reservoir Systems Package

NIH\_ReSyP

Inflow  
Estimation

Reservoir  
Sedimentation

Capacity  
Computation

Spillway Regulation

HydroPower  
Analysis

Flood  
Operation

Reservoir  
Routing

Developed By :  
Water Resources Systems Division  
NATIONAL INSTITUTE OF HYDROLOGY  
Jalvigyan Bhawan  
Roorkee -247667 (Uttaranchal)  
India

Conservation  
Operation

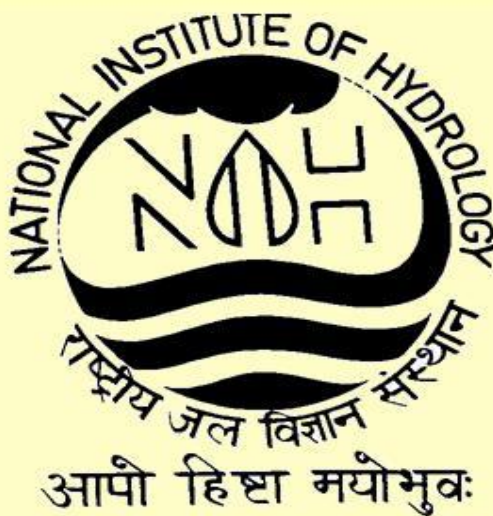
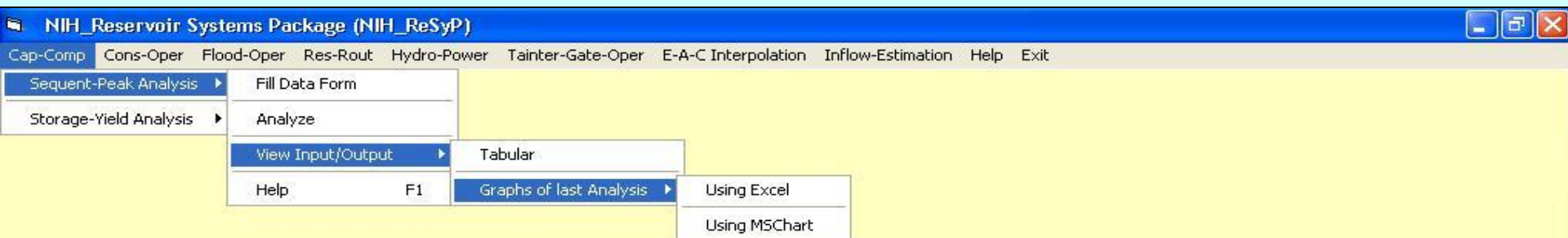
Start ReSyP

Quit ReSyP

# Analysis Options Available in *NIH\_ReSyP*

- **Reservoir capacity estimation using sequent-peak method**
- **Storage-Yield-Reliability analysis**
- **Hydropower analysis**
- **Operation analysis of a Multi-purpose Multi-reservoir system for conservation purposes**
- **Operation analysis of a Multi-purpose Multi-reservoir system for flood control**
- **Reservoir sedimentation analysis**
- **Probable inflow estimation**
- **Reservoir routing**
- **Estimation of trial Rule Curves for a reservoir**
- **Interpolation of elevation-area-capacity (EAC) table**
- **Reservoir inflow estimation using rate of rise method**

# Analysis Ladder for a Module of NIH\_ReSyP



# Sample Input-Output of NIH\_ReSyP

NIH\_Reservoir Systems Package (NIH\_ReSyP)

Cap-Comp Cons-Oper Flood-Oper Res-Rout Hydro-Power Tainter-Gate-Oper E-A-C Interpolation Inflow-Estimation Help Exit

Data Entry for Sequent Peak Algorithm

Title of the Problem: Sample Data for Sequent Pe

Name of Reservoir: Test Reservoir

Starting Year: 1935

Starting Month: 1

Number of Months for Analysis: 30

Demand Vary Each Year: Y

Factor for Converting Inflows to 'Cu. m': 0.1

Factor for Converting Demands to 'Cu. m': 0.1

Inflow and Demand Values

Retrieve Save Clear Close

Sequent-Peak-Analysis

Sample Data Input Form

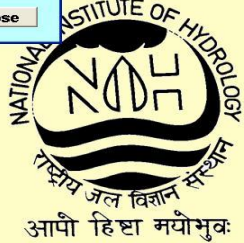
NIH\_Reservoir Systems Package (NIH\_ReSyP)

Cap-Comp Cons-Oper Flood-Oper Res-Rout Hydro-Power Tainter-Gate-Oper E-A-C Interpolation Inflow-Estimation Help Exit

Analyze

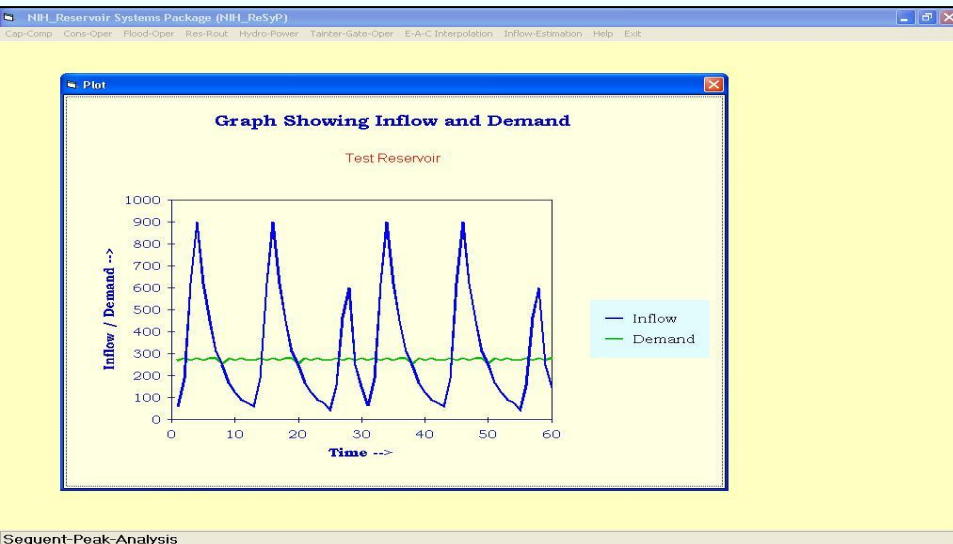
Input File Name (\*.spi): C:\NIH\_ReSyP\_130111\SEQP Browse

Output File Name (\*.spo): C:\NIH\_ReSyP\_130111\seqsp. Run Close



Sequent-Peak-Analysis

Sample Analysis Window



Sample Graphical Output

NIH\_Reservoir Systems Package (NIH\_ReSyP)

Cap-Comp Cons-Oper Flood-Oper Res-Rout Hydro-Power Tainter-Gate-Oper E-A-C Interpolation Inflow-Estimation Help Exit

Tabular Data

File Edit

CAPACITY COMPUTATION FOR A RESERVOIR

Test Reservoir

Period	Stor(T)	InFlow(T)	Demand(T)	Stor(T+1)	Cum_(InF-Dem)
1	.00	60.05	270.02	209.97	-209.97
2	209.97	186.05	279.02	302.94	-302.94
3	302.94	620.05	270.02	.00	47.09
4	.00	900.05	279.00	.00	668.14
5	.00	620.05	270.00	.00	1018.19
6	.00	450.00	279.00	.00	1189.19
7	.00	310.00	279.00	.00	1220.19
8	.00	248.00	252.00	4.00	1216.19
9	4.00	168.00	279.00	115.00	1105.19
10	115.00	124.00	270.00	261.00	959.19
11	261.00	90.00	279.00	450.00	770.19
12	450.00	77.50	270.00	642.50	577.69
13	642.50	60.00	270.02	852.52	367.67
14	852.52	186.00	279.02	945.54	274.65
15	945.54	600.00	270.02	595.56	624.63
16	595.56	900.00	279.00	.00	1245.63
17	.00	620.00	270.00	.00	1595.63
18	.00	450.00	279.00	.00	1766.63
19	.00	310.00	279.00	.00	1797.63
20	.00	248.00	252.00	4.00	1793.63
21	4.00	168.00	279.00	115.00	1682.63
22	115.00	124.00	270.00	261.00	1536.63
23	261.00	90.00	279.00	450.00	1347.63
24	450.00	77.50	270.00	642.50	1155.13
25	642.50	45.00	270.02	867.52	930.11
26	867.52	155.00	279.02	991.54	806.09
27	991.54	467.00	270.02	796.56	1806.07
28	796.56	600.00	279.00	475.56	1322.07

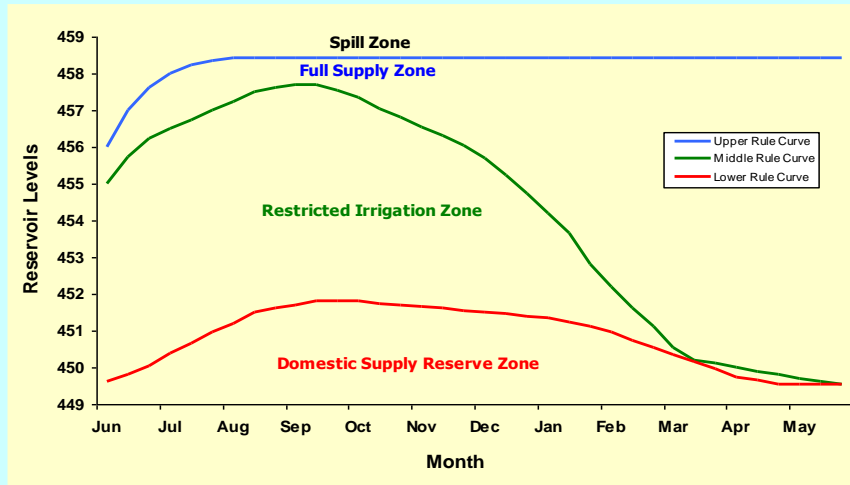
Sequent-Peak-Analysis

Sample Tabular Output

# Conservation Operation of a Multi-reservoir System

- Operates a multi-reservoir system for D&I demands, irrigation, hydropower, and minimum flow requirements.
- Any configuration of storage & diversion structures can be simulated.
- Ten-daily or Monthly time steps can be used.
- Interbasin water transfer can be simulated.
- Rule-curves based operation is followed. ReSyP helps fine-tune operation policy of a reservoir system.
- Reliabilities/ resilience/ vulnerability of structures are computed.
- User-controlled detailed working table is generated for all dams/ diversions.

# Conservation Operation of a Multi-reservoir System



Rule-curve based operation

The screenshot shows the 'Data Entry for Conservation Operation' form. Key fields include: Name of Structure (Reservoir 2), Number of Immediately U/S Structures (1), IDs of Immediately U/S Structures (1), Gross Capacity at FRL 'MCM' (3657.489), Gross Capacity at MDDL 'MCM' (740.0178), Initial Capacity at Start of Simulation 'MCM' (2000), Method of Hydropower Supply (1 - All Releases Pe), Reduction Factor for Irrigation in Scarcity (0 to 1) (0.8), Reduction Factor for Hydropower in Scarcity (0 to 1) (0.9), Factor Defining Critical Supply Conditions (0 to 1) (0.75), and various conversion factors for inflows, power demand, irrigation demand, domestic demand, transfer demand, elevation, evaporation depths, area, and capacity.

Input Data Form

The screenshot shows the 'Data Entry for Conservation Operation' form. Key fields include: Installed Capacity of Power Plants 'MW' (90), Tail Water Elevation 'm' (370), Minimum Reservoir Level for Power Generation 'm' (403.55), Efficiency of Power Plants (%) (0.9), Number of Data Points in E-A-C Table (9), Details of Results Required (2), ID of D/S Structure (0), Return Flow from Irrigation Release (%) (0), Does this Structure Transfer Water to other Structures/Basin (Yes), ID of Structure from Which Water is Received (0), Enroute Diversion/Conveyance Loss (%) (0), Inflow Data Available (1)/Computed (2) (1), Specify Structure ID for Computing Inflows for Present Structure, and Inflow Modifying Factor.

Input data Form

The screenshot shows the 'Select Graph' dialog box. The user can select the graph type from a list: Inflow and Release, Total Demand and Release, and Reservoir Levels and Rule Curve Levels. The user can also select the structure from a list: Reservoir 1 and Reservoir 2.

Option for Graphical Output



# Conservation Operation of a Multi-reservoir System – Reservoir Working Tables

Working Table for Location No. 1 -Rajghat Dam

At this node, WS + Min\_flow only pass thru plant

Monthly priorities (0 means Irrigation has higher priority)

0 0 0 0 0 0 0 0 0 0 0 0

A link diverts water from this node

Water supply demands at this node (m m3)

14.53 15.23 2.77 .92 1.16 11.53 27.22 17.07 10.15 2.31 11.07 11.07

Link demands at this node (m m3)

10.0 10.5 1.9 .6 .8 8.0 18.8 11.8 7.0 1.6 7.7 7.7

Irrigation demand 1 at this node (m m3)

18.11 18.98 3.45 1.15 1.44 14.37 33.92 21.27 12.65 2.87 13.80 13.80

Irrigation demand 2 at this node (m m3)

4.08 4.28 .78 .26 .32 3.24 7.65 4.80 2.85 .65 3.11 3.11

Minimum quantity to be released from this node (m m3)

11.00 11.00 11.00 11.00 11.00 11.00 .00 .00 .00 11.00 11.00 11.00

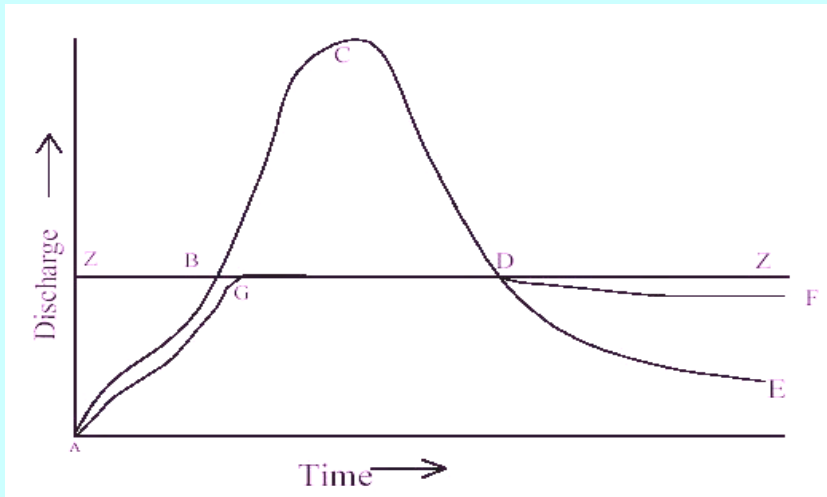
YYYY-Mn-D	Ini_Sto m m3	Loc_Flo m m3	Evapr m m3	Tir_Dem m m3	Pw_Dem m m3	Tds_Dem m m3	Ir_Rel m m3	Ws_Rel m m3	Tot_Rel m m3	Pw_Gen MKwh	PW_ReI m m3	Lin_Dv m m3	Spill m m3	End_Lev m	MdI_RuI m	Upr_RuI m	
1981-06-0	350.0	36.3	20.0	17.6	.0	35.7	.0	11.5	22.5C	.2	22.5	.0L	0.	358.50	364.00	371.00	H
1981-07-0	343.8	302.5	10.8	41.6	.0	58.3	.0	27.2	27.2C	.3	27.2	18.8	0.	361.15	364.00	371.00	A
1981-08-0	589.5	1482.8	15.1	26.1	.0	36.5	21.3	17.1	79.7	1.3	53.6	11.8	0.	369.83	364.00	371.00	I
1981-09-0	1965.7	190.0	23.9	15.5	.0	21.7	12.6	10.1	47.4	1.1	31.9	7.0	0.	370.38	364.00	371.00	I
1981-10-0	2077.4	48.9	20.0	3.5	.0	15.9	2.9	2.3	21.8	.7	18.2	1.6	0.	370.41	364.00	371.00	I
1981-11-0	2083.0	28.9	14.6	16.9	.0	34.7	13.8	11.1	62.7	1.6	45.8	7.7	0.	370.14	364.00	371.00	A
1981-12-0	2026.9	14.0	13.3	16.9	.0	34.7	13.8	11.1	62.7	1.6	45.8	7.7	0.	369.79	364.00	371.00	A
1982-01-0	1957.3	35.7	14.4	22.2	.0	42.1	18.1	14.5	78.8	1.9	56.6	10.0	0.	369.45	364.00	371.00	A
1982-02-0	1889.7	49.6	18.0	23.3	.0	43.6	19.0	15.2	82.1	1.9	58.8	10.5	0.	369.15	364.00	371.00	H
1982-03-0	1828.7	14.3	34.3	4.2	.0	16.9	3.5	2.8	23.9	.6	19.7	1.9	0.	368.92	364.00	371.00	H
1982-04-0	1782.9	1.2	57.5	1.4	.0	13.0	1.1	.9	15.3	.4	13.9	.6	0.	368.56	364.00	371.00	H
1982-05-0	1710.8	5.8	77.0	1.8	.0	13.5	1.4	1.2	16.4	.4	14.6	.8	0.	368.11	364.00	371.00	H
1982		2210.	319.	190.9	0.	367.	131.8	125.	540.	12.	409.	78.	0.				

- **Systems studied:** Sabarmati, Machhu, Bargi, Vellar, Peninsular Part of River Interlinking Scheme, Ken-Betwa Interlinking project, ...
- **Publications:** Jain, S.K., Goel, M.K. and Agarwal, P.K. (1998). "Reservoir operation studies for Sabarmati system, India", J of Water Res Plan and Manag, ASCE, 124(1), 31-38.
- Jain, S.K., Reddy, NSRK, and Chaube, U.C. (2005). "Analysis of a Large Inter-basin Water Transfer System in India." Hydrological Sciences J, IAHS, 50(1), 125-137.
- Jain, S. K., and Bhunya, P. K. (2008). "Reliability, resilience, and vulnerability of a multipurpose storage reservoir." Hydrological Sciences J, IAHS, 53(2), 434-447.
- Jain, S.K. (2010). Investigating the behavior of statistical indices for performance assessment of a reservoir. Journal of Hydrology, 391, 90-96.

# Flood Operation of a Multi-reservoir System

- **For operation analysis of a multi-reservoir system for flood control.**
- **Any configuration of storage & diversion structures can be simulated.**
- **Time steps – Multi-hours.**
- **For each structure, inflow hydrograph + flow from intermediate catchment is needed.**
- **Each reservoir is operated so that incoming flood is passed safely with least d/s flooding while ensuring safety of dam.**
- **Several methods are available for channel routing.**
- **User-controlled detailed working table is generated for all dams/ diversions.**

# Flood Operation of a Multi-reservoir System



**Flood control operation**

**Data Entry for Flood Control Operation**  
Reservoir 2

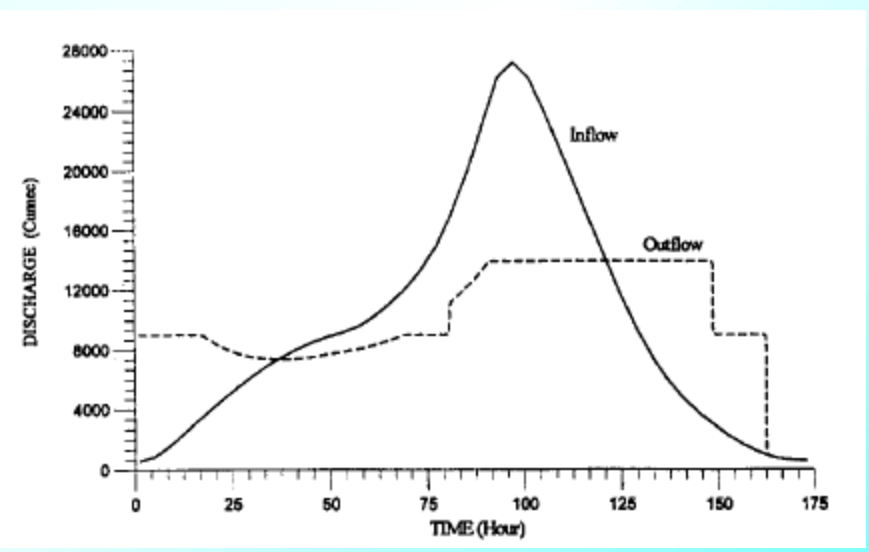
Number of Immediately U/S Structures	1	<input type="button" value="Retrieve"/>	<input type="button" value="Close"/>
IDs of Immediately U/S Structures (Space-Separated)	01	<input type="button" value="Save Data File"/>	<input type="button" value="Clear"/>
Maximum Storage Capacity 'MCM'	3657.489		
Dead Storage Capacity 'MCM'	740.018		
Initial Capacity at Start of Simulation 'MCM'	3000		
Gate Factor (0.1 to 1 - Storage Dam, 2 - Ungated Dam, 3 - Diversion)	0.9	<input type="button" value="Specify E-A-C-R Table"/>	
Full Reservoir Level (m)	420	<input type="button" value="Specify Upper Rule Levels"/>	
Safe Capacity of D/S Channel 'Cumec'	9000	<input type="button" value="Specify Evaporation Depths"/>	
Reservoir Critical Level (m)	422	<input type="button" value="Specify Inflow Data"/>	
Safe capacity of d/s channel (cumec)	14000	<input type="button" value="Save Structure Information"/>	
Max. Permissible Change in Release in Consecutive Periods	1.6		
Factor for Converting Elevation in E-A-C-R Table to 'm'	1		
Factor for Converting Evaporation Depths to 'm'	1		
Factor for Converting Area in E-A-C-R Table to 'sq.m'	1		
Factor for Converting Cap. in E-A-C-R Table to 'cu.m'	1		
Factor for Converting Rel. Capacity in E-A-R-C Table to 'cu.m'	1		

**Input Data Form**

**Data Entry for Flood Control Operation**

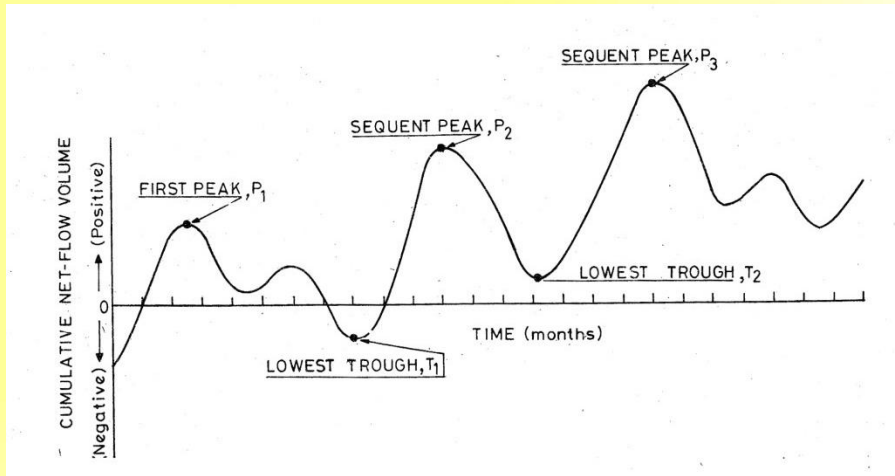
Minimum Release to be made 'Cumec'	<input type="text"/>	<input type="button" value="Retrieve"/>	<input type="button" value="Close"/>
Number of Data Points in E-A-C-R Table	9	<input type="button" value="Save Data File"/>	<input type="button" value="Clear"/>
Whether Routing in Downstream Channel to be Carried out	Yes		
Muskingum Parameters 'k'	4		
'x'	0.1		
Inflow Data Available (1)/Computed (2)	1	<input type="button" value="Specify E-A-C-R Table"/>	
Inflow Modifying Factor	<input type="text"/>	<input type="button" value="Specify Upper Rule Levels"/>	
Structure ID. for Computing Inflows for Present Structure	<input type="text"/>	<input type="button" value="Specify Evaporation Depths"/>	
For Detailed Results Enter "1"	<input type="text"/>	<input type="button" value="Specify Inflow Data"/>	

**Input data Form**



**Graphical Output**

# Capacity Computation Using Sequent Peak Method



**Sequent Peak Algorithm**

**Data Entry for Sequent Peak Algorithm**

Title of the Problem: Sample Data for Sequent Pe

Name of Reservoir: Test Reservoir

Starting Year: 1935

Starting Month: 1

Number of Months for Analysis: 30

Demand Vary Each Year: Y

Factor for Coverting Inflows to 'Cu. m': 0.1

Factor for Coverting Demands to 'Cu. m': 0.1

Buttons: Retrieve, Save, Clear, Close

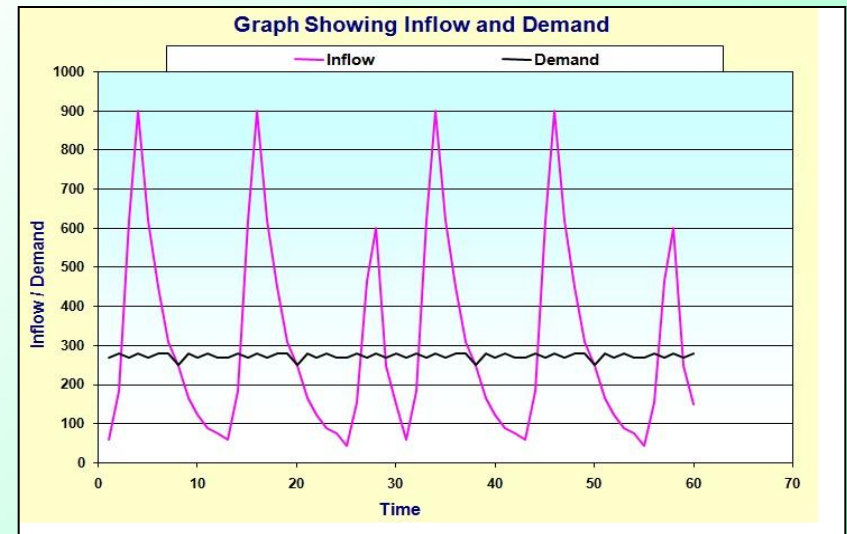
**Input Data Form**

**Data Entry for Sequent Peak Algorithm**

Month-Year	Inflow	Demand
Jan-1935	600.5	2700.2
Feb-1935	1860.5	2790.2
Mar-1935	6200.5	2700.2
Apr-1935	9000.5	2790
May-1935	6200.5	2700
Jun-1935	4500	2790
Jul-1935	3100	2790
Aug-1935	2480	2520
Sep-1935	1680	2790
Oct-1935	1240	2700
Nov-1935	900	2790
Dec-1935	775	2700

Buttons: Retrieve, Save, Go Back, Clear, Close

**Data Form for Tabular Data**



**Graphical Output**

# Hydropower Analysis

## **Firm Power Determination**

- **Maximum possible firm power depends upon the site conditions, hydrology of the area, type of load, and features of power plant.**
- **An optimization algorithm is used to determine firm power from a reservoir.**
- **SLOP is used for simulation of reservoir operation. Computations are repeated till convergence is attained.**

## **Hydropower Simulation**

- **Knowing the given power demand, the reservoir simulation is carried out to find out power generation and reliabilities.**

# Storage-Yield-Reliability Analysis

NIH\_Reservoir Systems Package (NIH\_ReSyP)  
 Cap-Comp Cons-Oper Flood-Oper Res-Rout Hydro-Power Tainter-Gate-Oper E-A-C Interpolation Inflow-Estimation Help Exit

Data Entry for Storage Yield Analysis

Sample Data for Storage Yield

Title of the Problem: Test Reservoir

Name of Reservoir: Test Reservoir

Starting Year: 1935

Starting Month: 6

Number of Months for Analysis: 324

Dead Storage Capacity (MCM): 119.287

Initial Reservoir Storage: 200

YIELD Known and STORAGE Calculated: Y

Specify Annual Yield (MCM): 1200

Specify Storage (MCM): 1200

No. of Data Points in E-A-C Table: 12

Required Reliability (0-1): 0.9

Evaporation Accuracy (0.00001 - 0.1): 0.001

Overall Accuracy (0.00001 - 0.1): 0.0001

Factor for Coverting Inflows to 'Cu. m': 1000000

Factor for Converting Evaporation to 'm': 1

Factor for Converting Elevation to 'm': 1

Factor for Converting Area to 'Sq. m': 1000000

Factor for Converting Capacity to 'Cu. m': 1000000

E-A-C Table

Evaporation Depths

Monthly Yield Factors

Inflow

Retrieve

Save

Clear

Close

## Opening data form for storage-yield analysis module

### Sample Output file Generated

Reservoir Storage Required = 2812.22 M Cum, Number of Failures = 125  
 Reliability Achieved = .61

Reservoir Monthly Working Table

Month	Ini_Sto	Inflow	Demand	Release	Evap	End_Sto
1	200.00	13.540	108.000	88.150	6.103	119.29*
2	119.29	333.790	72.000	72.000	6.118	374.96
3	374.96	172.370	72.000	72.000	8.982	466.35
4	466.35	263.220	68.400	68.400	12.079	649.09
5	649.09	45.290	111.600	111.600	13.510	569.27
6	569.27	12.310	109.680	109.680	12.285	459.61
7	459.61	14.300	109.680	109.680	10.504	353.73
8	353.73	.470	109.680	109.680	7.912	236.61
9	236.61	.890	109.680	109.680	5.679	122.14
10	122.14	.860	109.680	.000	4.131	118.87*
11	118.87	.500	109.680	.000	5.125	114.24*
12	114.24	.270	109.680	.000	6.239	108.27*
13	108.27	.460	108.000	.000	4.202	104.53*
14	104.53	229.220	72.000	72.000	4.769	256.98
15	256.98	630.410	72.000	72.000	11.207	804.19

# Derivation of Trial Rule Curves

Data Entry for Initial Rule Curve Derivation

Title of the Problem: Rule Curve Derivation for Ba

Name of Reservoir: Bargi

Method of Supply through Power Plant: Irr Rel Pass through Plant

Minimum Drawdown Level (m): 403.55

Full Reservoir Level (m): 422.76

No. of Data Points in E-A-C Table: 9

Factor for Coverting Inflows to 'Cu. m': 100000

Factor for Coverting Irr. Demand to 'Cu. m': 100000

Factor for Coverting Power Demand to 'Cu. m': 100000

Factor for Converting Evaporation to 'm': 1

Factor for Converting Elevation to 'm': 1

Factor for Converting Area to 'Sq. m': 1

Factor for Converting Capacity to 'Cu. m': 1

Maximum Capacity of the Power Plant (MW): 90.0

Tail Water Level (m): 370.00

Minimum Reservoir Level for Power Plant (m): 403.55

Efficiency of Power Plant: 0.90

High Priority to: 0 - Irrigation

Buttons: E-A-C Table, Evaporation Depth, Inflow Data, Demand Data, Retrieve, Save, Clear, Close

## Input Data Form

Data Entry for Initial Rule Curve Derivation

Title of the Problem: (Press F1 for Paste)

Name of Reservoir: Bargi

Method of Supply through Power Plant: Irr Rel Pass through Plant

Minimum Drawdown Level (m): 403.55

Full Reservoir Level (m): 422.76

No. of Data Points in E-A-C Table: 9

Factor for Coverting Inflows to 'Cu. m': 100000

Factor for Coverting Irr. Demand to 'Cu. m': 100000

Factor for Coverting Power Demand to 'Cu. m': 100000

Factor for Converting Evaporation to 'm': 1

Factor for Converting Elevation to 'm': 1

Factor for Converting Area to 'Sq. m': 1

Factor for Converting Capacity to 'Cu. m': 1

Maximum Capacity of the Power Plant (MW): 90.0

Tail Water Level (m): 370.00

Minimum Reservoir Level for Power Plant (m): 403.55

Efficiency of Power Plant: 0.90

High Priority to: 0 - Irrigation

Reliable Inflows Table:

	50%	75%	90%
January	41.75	26.95	18.25
February	27.01	16.2	10.39
March	16.15	9.86	6.13
April	7.71	4.53	2.79
May	3.27	1.87	1.08
Jun	42.91	12.69	4.24
July	1264.77	699.49	368.3
August	3191.52	2375.18	1650.75
September	1526.87	888.49	476.86
October	323.68	174.07	93.06
November	94.45	60.91	38.78
December	52.37	35.5	25.48

Buttons: E-A-C Table, Evaporation Depth, Inflow Data, Demand Data, Retrieve, Save, Clear, Close, Submit Values

## Data Form for Reliable flows

## Sample Output file Generated

### RULE CURVE DERIVATION FOR A RESERVOIR

#### Upper Rule Curve Levels (Jan...Dec)

416.59 413.70 411.26 408.55 406.02 422.76 422.76  
 422.76 422.76 422.76 420.97 419.17

#### Irrigation Rule Curve Levels (Jan...Dec)

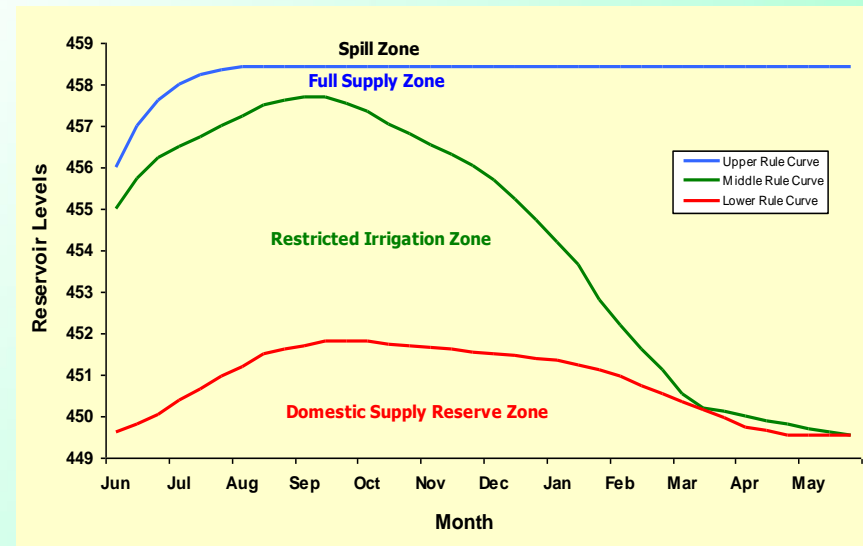
416.59 413.70 411.26 408.55 406.02 415.81 418.13  
 420.44 422.76 422.76 420.97 419.17

#### Hydropower Rule Curve Levels (Jan...Dec)

413.66 412.57 411.26 408.55 406.02 403.55 407.93  
 412.31 416.69 418.50 416.54 415.22

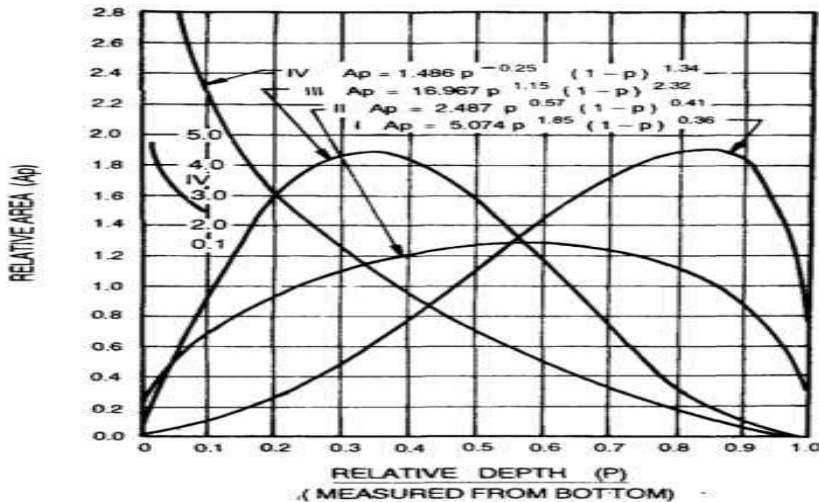
#### Domestic Supply Rule Curve Levels (Jan...Dec)

403.76 403.79 403.82 403.78 403.68 403.55 403.58  
 403.61 403.64 403.67 403.70 403.73



## Graphical Output

# Reservoir Sedimentation Analysis

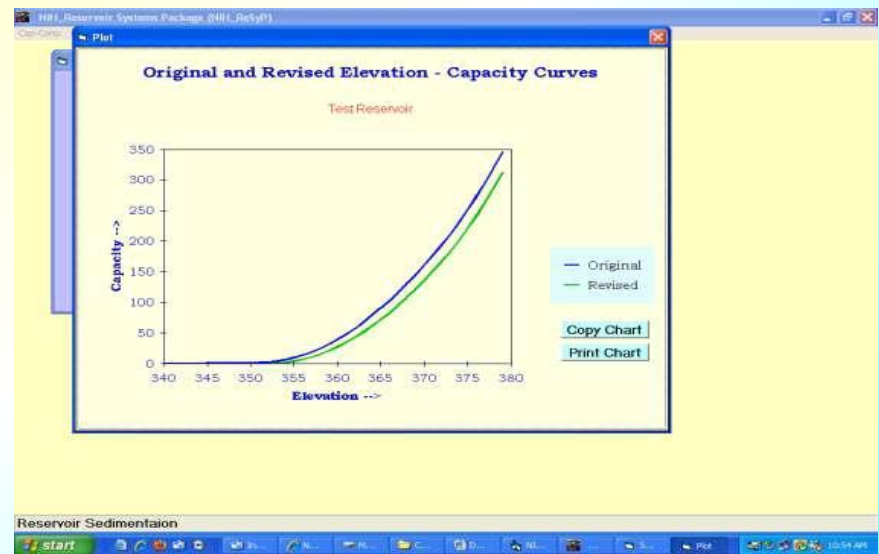


**Empirical Area Reduction Method**

**Input Data Form**

Elev.	Orig. Ar.	Orig. Cap.	Rel. Dep.	Ap	Sed. Ar.	Tot. Scap	Rev. Ar.	Rev. Cap.
340.00	.004	.000	.000	.0000	.004	.000	.000	.000
341.00	.007	.005	.005	.3006	.007	.005	.000	.000
342.00	.012	.015	.050	.4415	.012	.015	.000	.000
343.00	.018	.030	.075	.5503	.018	.030	.000	.000
344.00	.027	.052	.100	.6411	.027	.052	.000	.000
345.00	.080	.103	.125	.7197	.080	.103	.000	.000
346.00	.044	.164	.150	.7891	.044	.164	.000	.000
347.00	.055	.214	.175	.8510	.055	.214	.000	.000
348.00	.076	.279	.200	.9068	.076	.279	.000	.000
349.00	.203	.413	.225	.9573	.203	.413	.000	.000
350.00	.470	.741	.250	1.0029	.470	.741	.000	.000
351.00	.748	1.344	.275	1.0443	.748	1.344	.000	.000
351.79	1.094	2.102	.295	1.0742	1.094	2.102	.000	.000
352.00	1.186	2.303	.300	1.0817	1.102	2.332	.084	.000
353.00	1.930	3.846	.325	1.1155	1.136	3.451	.794	.395
354.00	2.876	6.233	.350	1.1457	1.167	4.602	1.709	1.631
355.00	3.900	9.608	.375	1.1727	1.194	5.793	2.705	3.825
356.00	4.456	13.783	.400	1.1964	1.219	6.989	3.237	6.794
357.00	5.447	18.726	.425	1.2171	1.240	8.218	4.207	10.508
358.00	6.302	24.596	.450	1.2347	1.257	9.467	5.045	15.129
359.00	7.420	31.449	.475	1.2493	1.272	10.732	6.148	21.717
360.00	8.264	39.287	.500	1.2609	1.284	12.010	6.980	27.277
361.00	9.111	47.971	.525	1.2694	1.293	13.299	7.818	34.672
362.00	9.877	57.463	.550	1.2750	1.298	14.594	8.579	42.869
363.00	10.600	67.699	.575	1.2774	1.301	15.894	9.299	51.805
364.00	11.415	78.704	.600	1.2766	1.300	17.195	10.115	61.503
365.00	12.086	90.428	.625	1.2726	1.296	18.493	10.740	71.935
366.00	12.974	102.930	.650	1.2650	1.288	19.785	11.686	83.145
367.00	13.994	116.411	.675	1.2539	1.277	21.068	12.717	95.343
368.00	14.693	130.753	.700	1.2388	1.262	22.337	13.431	108.416
369.00	15.334	145.766	.725	1.2195	1.242	23.589	14.092	122.177
370.00	15.879	161.371	.750	1.1957	1.218	24.819	14.661	136.552
371.00	16.419	177.520	.775	1.1667	1.188	26.022	15.231	151.498
372.00	17.094	194.275	.800	1.1320	1.153	27.192	15.941	167.083
373.00	18.211	211.924	.825	1.0907	1.111	28.324	17.100	183.600
374.00	19.463	230.758	.850	1.0453	1.061	29.402	18.402	201.348
375.00	21.187	251.077	.875	.9825	1.001	30.440	20.186	220.637
376.00	22.413	272.874	.900	.9112	.928	31.404	21.485	241.470
377.00	23.493	295.825	.925	.8225	.838	32.287	22.655	263.538
378.00	24.721	319.929	.950	.7072	.720	33.065	24.001	286.864
379.00	25.899	345.297	.975	.5642	.542	33.745	25.345	311.529
380.00	27.237	371.802	1.000	.0000	.000	33.882	27.237	337.920

**Tabular Output**



**Graphical Output**



# SUMMARY

- We present a package for various analyses pertaining to a (system of) reservoirs.
- A Windows based GUI and input menu screens have been developed for easier use.
- Tabular & graphical options with inter-portability of data from MS-Excel.
- Software can be **used to develop conservation and flood control policy** for a system of reservoirs. It can also consider inter-basin water transfer.
- Software is continuously up-dated with regular annual trainings and is nominally priced.
- Looking for feedbacks to improve.

# **Hydrology and Water Resources Information System for India**

**[www.nih.ernet.in/rbis/rbis](http://www.nih.ernet.in/rbis/rbis)**

# Hydrology and Water Resources Information System for India

Topography

Water Facts

River Basins

Water Resources Utilisation

Climate

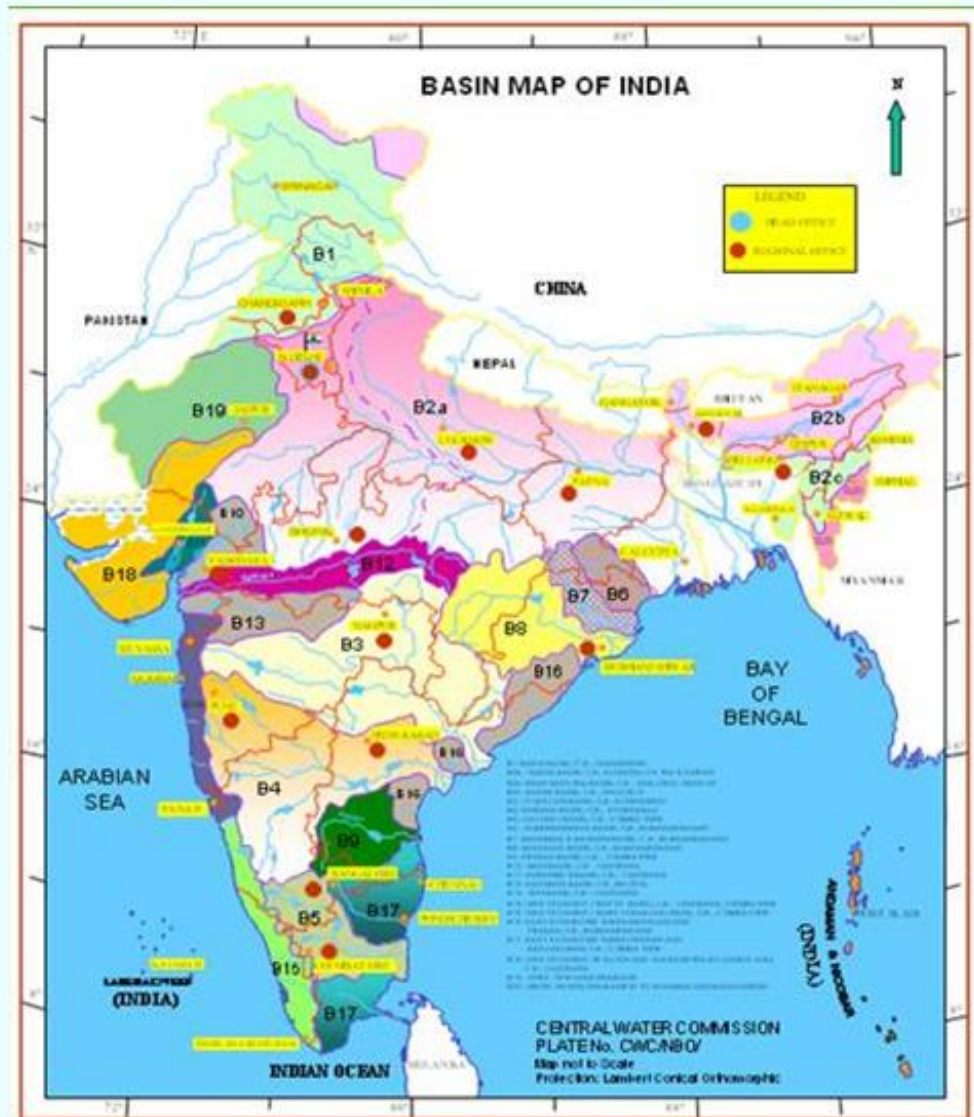
Thematic M

- ⊙ Organisations
- ⊙ National Water Policy
- ⊙ Constitutional Provisions
- ⊙ Treaties and Tribunal Awards
- ⊙ Video Hydrology
- ⊙ Mythologies
- ⊙ On-line ET Computations
- ⊙ Fundamentals On-line



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**Note:** For international / state boundaries and coastline, authoritative Survey of India maps may be referred to

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