भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन नदी विकास एवं गंगा संरक्षण विभाग
केन्द्रीय जल आयोग
राष्ट्रीय जल अकादमी

Government of India
Ministry of Jal Shakti
Dept. of Water Resources, RD&GR
Central Water Commission
National Water Academy

संख्या/No. T-980119/17/2021-NWA-PUNE/733-81 Dated : 30.01.2023

प्रति/To,

All the State & Central Implementing Agencies of NHP (As per list enclosed)

विषय/Sub: Training Program on **'Arc Hydro and Advanced WRM Applications'** during 06th – 10th February 2023 - Request for Nominations - Reg

Sir/Madam,

National Water Academy, CWC, Pune is organizing a training Program on **'Arc Hydro and Advanced WRM Applications'** under National Hydrology Project (NHP) of DoWR, RD & GR, MoJS, Govt. of India during **06th to 10th February 2023**. The training program will be conducted in hybrid mode at NWA campus, Pune consisting of online sessions by Dr. Dean Djokic, Arc Hydro Team Lead, ESRI Inc as well as offline lecture/ hands-on sessions. A brochure and tentative list of topics/exercises proposed to be covered during the training program is enclosed.

The program is intended for officers belonging to Central and State Implementing Agencies (IAs) of NHP who have good knowledge about the concepts of GIS and Remote Sensing. Prior knowledge of working with ArcGIS desktop software is preferable. There is no course fee for the program. The lodging & boarding of the participants will be borne by NWA.

Accordingly, it is requested to nominate 1-2 officers from your agency/organization for participating in the above program. The nominations can be registered on-line in the MIS of NHP portal and the nominated official(s) may also be asked to fill up this form (https://forms.gle/XD3e8FqePZKH9HQi6) positively by 03.02.2023 (FN). Final list of accepted nominations will be displayed on NWA website on 03.02.2023 (AN).

This issues with the approval of Chief Engineer, NWA, CWC, Pune.

भवदीय/Yours Sincerely,

K. S. Chaitanya 2023.01.30 19:11:22 +05'30'

(चैतन्य के एस / Chaitanya K S)
उप निदेशक एवं कार्यक्रम निदेशक / Dy. Director & Course Director

Copy for kind information to:

1) Senior Joint Commissioner, NPMU-NHP, DoWR, RD & GR, MoJS, New Delhi
2) Director, Training Directorate, CWC, New Delhi with a request to circulate the information for seeking nominations from CWC officers
3) Director, RDC-I Directorate, CWC, New Delhi

पुणे सिंहगड़ रोड,
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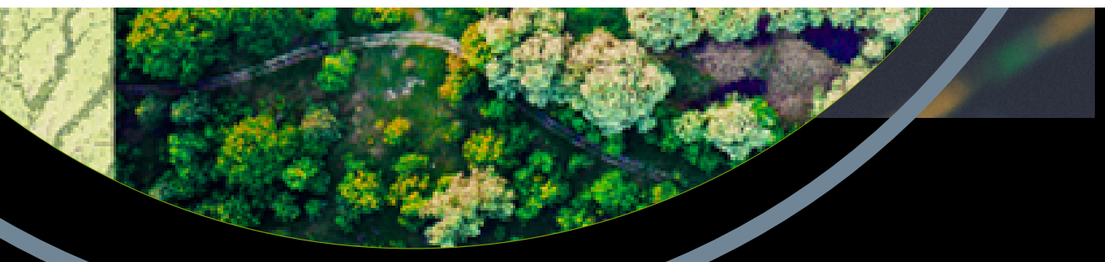
Central Water Commission
National Water Academy

Training Program on
'Arc Hydro and Advanced WRM Applications'
(06-10, February 2023)



Lead Instructor
Dr. Dean Djokic

Principal Consultant in Water Resource
ArcHydro Team Lead
ESRI Inc.

Proposed Topics :

- Overview of Arc Hydro; Typical data sources for Hydrologic & Hydraulic (H&H) analyses; Terrain representations; H&H Modeling; Integrated analyses
- Exercises on floodplain delineation, forecasting & Impact assessment

Program Format:

Classroom Training Program with Online/Offline lecture and Hands-on Sessions at NWA Campus, Pune

Who can attend:

Officers from Implementing Agencies of NHP having good knowledge of GIS & RS concepts. Knowledge of working with ArcGIS desktop software is preferable

Registration:

Fill in the Google form (in addition to registration on NHP MIS) using the link given below on or before 02.02.2023

https://forms.gle/XD3e8FqePZKH9HQi6

For any further information please contact:

Chaitanya K S
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Training Program on
'ArcHydro and Advanced WRM Applications'
(6-10, February 2023) at NWA, CWC, Pune

Proposed Topics and Exercises

Key topics

Overview of ArcGIS technology and Arc Hydro

- *Hydrologic and hydraulic modeling with GIS – concepts.*
- *Geodatabase principles.*
- *Relationships, networks, raster and vector data formats.*
- *Arc Hydro – template model for water resources.*
- *Arc Hydro tools – watershed delineation, characterization, time series management, …*

Typical data sources for H&H analyses

- *Terrain data.*
- *Rainfall – design, current, forecasted.*
- *Flows – historical, current.*
- *Land use, soils, roughness, …*
- *Issues of scale and data quality – how much impact does it really have.*

Terrain representations

- *Vector and raster terrain surface representation.*
- *Building terrain surfaces from various data sources – issues of scale and detail.*
- *Hydro-conditioning: imposing drainage patterns onto TINs and GRIDs.*
- *Dealing with large terrain datasets, non-dendritic terrain, and floodplains.*

H&H modeling

- *Basic principles of floodplain analysis.*
- *Hydrologic and hydraulic model components.*
- *Deterministic hydrologic modeling – HEC-HMS.*
- *Hydraulic modeling – HEC-RAS.*
- *Combining hydrology and hydraulics through GIS – data exchange points in space and time.*
- *Global flow data – GEOGloWS*
    - *Forecast*
    - *Retrospect and flood frequency*

Integrated analyses

- *From flow observations and models to floodplain – one size does NOT fit all.*
- *Real-time operations – integration with flow-forecast web services.*
- *GIS support for post H&H analyses – flood impact analyses – creating actionable intelligence.*

Exercises

	Key topics	Exercises
1	Getting data (international, US). 1. DEM. 2. Hydrography. 3. Flow forecasts. 4. Impact information / critical infrastructure.	#2
2	Fundamentals of Arc Hydro. 1. Data organization. 2. Projections. Analysis vs. publishing/display. 3. Starting a project. 4. Vector world. a. Assigning HydroID, NextDownID, StreamOrder, … b. Building a trace network. Tracing. 5. Raster world. a. Basic terrain preprocessing. b. Advanced terrain processing – managing known streams and sinks. c. Watershed delineation and characterization.	#1 #3 #4
3	Floodplain delineation. 1. Basic HAND processing. 2. Flood extent generation from HAND. 3. Floodplain sensitivity. 4. Flood slicing. 5. Rating curve derivation. 6. Advanced HAND processing.	#5
4	Impact assessment. 1. Data preparation (counts, densities, …). Vector vs. raster inputs. 2. Flood stack attribution.	#7
5	Flood forecasting. 1. From flow to depth and depth to flood extent. a. Manual process. b. Automation. 2. Flood frequency mapping	#8 #9

Class organization and delivery

The existing class exercises will be adjusted to work with the local data. The class exercises are presented in a form that an existing user of ArcGIS Pro can follow all the steps and execute them using ArcGIS Pro software.

- Use of globally available elevation, hydrography, forecast models, and impact data for a region in India.

- Any local data and hydrologic and hydraulic models provided by the World Bank and NHP Implementing Agencies for the same region in India.

Online Sessions (with two-way interaction enabled) will be delivered over three four-hour blocks from 0900 -1300 Hrs IST on 06th, 07th and 09th February 2023. Each block will consist of a lecture and overview presentation of the relevant exercises. The instructor will provide detailed discussion about the exercise and demonstrate key operations performed in the exercises.

The provided class materials will include both the exercise data and solutions so participants will be able to follow the presentation and review the data generated in exercises. Participants will also be able to run the exercise on their own, during Hands-on Sessions, and ask questions related to exercises and materials in general.

Tentative Daily schedule

- Day 1: 06.02.2023 (0900 Hrs – 1300 Hrs)
    - Introduction
    - Overview of ArcGIS technology and Arc Hydro
    - Typical data sources for H&H analyses
    - Review of Topics & Hands-on Sessions (1400 Hrs – 1700 Hrs)
- Day 2: 07.02.2023 (0900 Hrs – 1300 Hrs)
    - Terrain representations
    - Hydrologic analyses
        - Stochastic
        - Deterministic
    - Review of Topics & Hands-on Sessions (1400 Hrs – 1700 Hrs)
- Day 3: 08.02.2023
    - Review of Topics & Hands-on Sessions
- Day 4: 09.02.2023 (0900 Hrs – 1300 Hrs)
    - Hydraulic modeling
    - Floodplain delineation
    - Integrated system
    - Creating actionable intelligence
    - Review of Topics & Hands-on Sessions (1400 Hrs – 1700 Hrs)
- Day 5: 10.02.2023
    - Review of Topics & Hands-on Sessions
    - Conclusion & Feedback