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RPPR Final Report
as of 01-Jul-2018

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Proposal Number: 69652EVCF

Agreement Number: W911NF-17-1-0062

INVESTIGATOR(S):

Name: Kumud Acharya
Email: kumud.acharya@dri.edu
Phone Number: 7028625371
Principal: Y

Organization: **Desert Research Institute - Reno**

Address: 2215 Raggio Parkway, Reno, NV 895121095

Country: USA

DUNS Number: 134599174

EIN: 886000024

Report Date: 14-May-2017

Date Received: 27-Jun-2018

Final Report for Period Beginning 15-Dec-2016 and Ending 14-Feb-2017

Title: Workshop for Urban Flood Demo Program for Arid Regions Research Priority Development

Begin Performance Period: 15-Dec-2016

End Performance Period: 14-Feb-2017

Report Term: 0-Other

Submitted By: Sachiko Sueki

Email: sachiko.sueki@dri.edu

Phone: (702) 862-5417

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STEM Degrees:

STEM Participants:

Major Goals: Conduct Workshop for Urban Flood Demo Program for arid regions research priority development.

Accomplishments: Workshop was conducted and prioritized topics for arid regions research and development have been selected. See attached pdf for workshop agenda, finalized topics and their prioritizations.

Training Opportunities: Nothing to Report

Results Dissemination: Nothing to Report

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: Cary Talbot

Person Months Worked: 1.00

Funding Support:

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

Participant Type: Co PD/PI

Participant: Jesse Schlunegger

Person Months Worked: 1.00

Funding Support:

Project Contribution:

International Collaboration:

International Travel:

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National Academy Member: N
Other Collaborators:

Participant Type: Co PD/PI
Participant: Cuong Ly
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Bill Scharffenberg
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Alex Sanchez
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Matt Fleming
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Anna Faloon
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Rene Vermeeren
Person Months Worked: 1.00
Project Contribution:
International Collaboration:

Funding Support:

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International Travel:
National Academy Member: N
Other Collaborators:

Participant Type: Co PD/PI
Participant: Meg Jonas
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Travis Dahl
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Keith Flowers
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Mike Follum
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Ian Floyd
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: PD/PI
Participant: Kumud Acharya
Person Months Worked: 1.00
Project Contribution:

Funding Support:

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International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Participant Type: Co PD/PI
Participant: Julie Miller
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Faculty
Participant: Ken Adams
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Li Chen
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Graduate Student (research assistant)
Participant: Rose Shillito
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Graduate Student (research assistant)
Participant: Sachiko Sueki
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: John Olson
Person Months Worked: 1.00

Funding Support:

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Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Participant Type: Co PD/PI
Participant: Rina Schumer
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Faculty
Participant: Mark Hausner
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Co PD/PI
Participant: Seshadri Rajagopal
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)
Participant: Peng Jiang
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)
Participant: Hai Pham
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

Participant Type: Other Professional
Participant: Steve Parish

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Person Months Worked: 1.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

Funding Support:

Participant Type: Other Professional

Participant: Zachary Hills

Person Months Worked: 1.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

Funding Support:

Participant Type: Other Professional

Participant: Ryan Pearson

Person Months Worked: 1.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

Funding Support:

Workshop Agenda for Urban Flood Demo Program for Arid Regions Research Priority Development

U.S. Army Corps Engineers/Desert Research Institute

755 E. Flamingo Road, Las Vegas, Nevada

Contacts: Cary Talbot, USACE-ERDC
Kumud Acharya, DRI

Date: June 8-9, 2016

Wednesday, June 8, 2016

8:30 – 9:00 am Continental Breakfast
9:00 – 9:15 am Welcome/Introduction/Goals of the workshop (Cary/Kumud)
9:15 – 9:30 am History of the program – Meg Jonas
9:30 – 9:45 am Past research topics (Kumud)

What are new/future challenges on Urban Floods in arid regions?

10:00 – 10:15 am Rene Vermeeren (LA, USACE)
10:15 – 10:30 am Jesse Schlunegger (Sacramento, USACE)
10:30 – 10:45 am Steve Parish (CCRFCFCD)
10:45 – 11:00 am Zach Hill/Ryan Pearson (SNWA)
11:00 – 11:15 am Cuong Ly (USACE, SPD)
11:15 – 1:30 am Meg Jonas (HQUSACE)

Lunch/networking (@ DRI) 11:30 – 1:00 pm

Recent advances/science in Urban Floods

1:00 – 1:20 pm Cary Talbot (ERDC)
1:20 – 1:40 pm Matt Fleming (HEC)
1:40 – 2:00 pm Mike Follum & Ian Floyd (ERDC)
2:00 – 2:20 pm Julie Miller (DRI)
2:20 – 2:40 pm Ken Adams (DRI), Peng Jiang (DRI)
2:40 – 3:10 pm Break

Research Priority Discussion

3:10 – 5:00 pm Brainstorm and collect ideas for current and future research needs
6:00 – 8:00 pm Networking Mixer Gordon Biersch (Optional)

Thursday, June 9, 2016

8:30 – 9:00 am Continental Breakfast
9:00 – 11:00 am Finalize research ideas
11:00 – 12:00 pm Research Priority Ranking
12:00 pm **Workshop adjourns**

Outcome of Workshop

Arid Regions Research & Development Prioritized Topics by Category

June 8-9, 2016

Ranking criteria: H (high, score), MH (medium high), M (medium), L (low)

HYDROLOGY

- Flexible reservoir operation during droughts. (Balancing water supply vs. flood control.) **H (15)**
- Critical storm duration for arid regions. **H (12)**
- Rain on snow floods – critical challenge in Southwest, causes? How precipitation form is represented in models. **H (10)**
- Impact of climate change extremes on short duration storms (3hr, 6hr); incorporating into rainfall/runoff models. **MH**
- Hypothetical storms; area-reduction curves updated; uncertainty of precipitation is critical in models. **M**

HYDRAULICS

- Impact of vegetation on flow conveyance? (Conveyance, bend/wash out, n value, root characteristics) Vegetation effects on levees; variance guidelines. **H (15)**
- HYDRAULIC STRUCTURES: **H (10)**
 - o Improved in-stream structures – grade control and stabilization. Opinion vs science questions; ecological vs structural characteristics; identifying all costs including hard structure and ecological, e.g.; next generation grade/bank control structures are dynamic, i.e., fixed vs. zonal structures; carbon footprint – include as a metric.
 - o Drop inlet length vs. spacing, efficiency. Clear water vs. “real” flow, % clog effect;
 - o Trash collection system, detention basins/storm drains; floatable trash collection with variable velocities; access/security issues; Access/security vs. flow.
 - o High velocity channels, research into methods/durability; transitions; Joint design and spacing.
- River restoration and flood risk management in urban areas – deliver ecological benefits + flood risk benefits. **H (9)**
- Grouted stone erosion protection. Riprap designs, guidance **H (8)**
- Urban Flooding Issues: Good hydraulic models for storm drain systems. Current models are limited. **M**
- Numeric model for non-Newtonian flows **M**
- Temporary measures to increase flood conveyance for improved channels/levees or divert flows in developed areas. **M**
- Erosion protection using Turf reinforcement mats in the Southwest. Products? Ecologic support? Velocities? Durability? **L**

SEDIMENT TRANSPORT/GEOMORPHOLOGY

- Use of drones: both DRI and CE; imagery, LIDAR, ...; document fine-scale geomorphology for pre-event topography; models for sediment pulses in ephemeral streams; develop innovative low cost methods to get and manage data **H (9)**
- Not enough gage sediment data in West: Not enough data, how much data is needed? **H (8)**

- Reservoir sedimentation – develop improved methods for flushing, bypass and sediment placement downstream of dam. Vegetation stabilization of sediment. **H (8)**
- Watershed rehabilitation in arid regions – sediment management. **H (7)**
- Suspended sediment vs bedload. Bedload and geomorphology – bank erosion, headcuts. **MH**
- Flood hazard identification of alluvial fans; mapping of alluvial fans; planning assistance to states. **MH**
- Debris flows: Geologic/geomorphic debris flows reconstruction from remote sensing; develop precipitation thresholds for debris flows; assemble catalog (e.g., initiation zones, volumes, etc.). Basal interaction: stream bed and debris flow. Frequency/magnitude relationships for debris flow, bounds; translatable metrics. **M**
- Reservoir flushing and bypass permitting requirements – need more science to development guidelines what a permit needs and accomplishes. **M**
- Models for mixed density sediment. **L**

WILDFIRE HYDROLOGY AND HYDRAULICS

- Wildfire effects on flood frequency. **H (10)**
- Fire response: real-time flood mapping; post- vs. pre-fire flows and locations; risk mapping. **H (8)**
- Debris flows: Flow initiation, physically characterizing post-wildfire effects; characterizing shear stress **M**
- Post fire bulking factor. Review of use, bulking factors in hydrology, How to interpret USGS gage data wrt bulking measurements (depth vs. discharge) **M**

MISCELLANEOUS TOPICS

- Flood risk and permitting communication to public/decision makers/resource agencies especially in arid area with rare events. **H (8)**
- Environmental agency interaction; dynamic environmental conditions; perception of CE/DRI. **M**
- Perception of Federal guidance insensitive to arid/temperate climate; East Coast hydrologic/fluvia response is not universal; changing guidelines to meet management needs not just for floods, but for droughts; use CE/DRI interaction to insert arid perspective. Planning assistance to states especially smaller communities; **M**
- Long term O & M after restoration; Long-term maintenance of dynamic ecosystem? **M**
- Change of evaporation to reservoirs? **M**

Participants:

USACE: Cary Talbot, Jesse Schlunegger, Cuong Ly, Bill Scharffenberg, Alex Sanchez, Matt Fleming, Anna Faloon, Rene Vermeeren, Meg Jonas, Travis Dahl, Keith Flowers, Mike Follum, Ian Floyd

DRI: Kumud Acharya, Julie Miller, Ken Adams, Li Chen, Rose Shillito, Sachiko Sueki, John Olson, Rina Schumer, Mark Hausner, Seshadri Rajagopal, Peng Jiang, Hai Pham

CCRFCD: Steve Parish

SNWA: Zachary Hills, Ryan Pearson