



UNIVERSITY OF  
SASKATCHEWAN

## **Downstream: A performance-based knowledge mobilization project for water security**

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## Plain Language Summary

Between May 2013 and May 2014 the Global Institute for Water Security and the School of Environment and Sustainability partnered with the Department of Drama at the University of Saskatchewan to produce a touring play called “Downstream”. The play was funded by the Social Sciences and Humanities Research Council of Canada. It was an interactive performance where audience members influenced the outcome. The plot was based around a water stewardship board that needed to create a drought management plan. After some initial debate about courses of action, it came to the board’s attention that a serious flood was occurring upstream. The play then transformed into a game called “The Flood Management Challenge.” The board members morphed into egos (i.e. extreme versions of realistic perspectives) that represented key elements of the water sectors. The elements (e.g. irrigation district, fish in the river, golf course, prairie town, oil field, and delta village) presented arguments as to why they deserve to be protected from the devastating effects of the impending flood. The general audience members and five pre-selected ‘decision makers’ were then tasked with allocating resources (i.e. Ping-Pong balls). General audience members had 1 ball each while decision makers had 40 balls each. They allocated the balls to decide the level of protection each water sector element would get as the flood ran downstream. The performances had three objectives:

- 1) Mobilize knowledge about perspectives on water security
- 2) Assess the efficacy of forum theatre for knowledge mobilization and
- 3) Examine the decisions made by members of the audience.

The play invited the audience members to learn more about the different perspectives in water management. The options presented for flood protection and the resources to be allocated were constrained. This exposed decision makers to the realities of trying to manage a river basins across different sectors, stakeholder interests, and with limited resources. Although the characters and script presented extremes of personalities to the point of stereotypes, the play built empathy among water users in a fictional river basin by exposure to different viewpoints. These viewpoints arose from research workshops that were conducted across the Saskatchewan River Basin in 2012-2013.

The lead researchers, worked with a playwright, stakeholders, other scientists and the director to finalize the script. Actors and crew members were cast from senior students in the Department of Drama. These students gained the opportunity to be involved in a travelling show, undertook media training and learned about research translation, learned about water management in the Saskatchewan River Basin, and also, received honouraria for their work.

Downstream was a production that sought to bring people together on many levels; it was a collaboration between natural and social scientists working at the U of S, a playwright specializing in examining issues of power and oppression in society, and a pragmatic and student-focused Department of Drama.



## Overview

In this report we summarize the process for implementation of the grant requirements, and report on the management of the grant. We describe the results of built-in data collection pieces, and the focus groups aimed at testing whether this form of arts-based knowledge mobilization was effective. We also explore future opportunities for the Global Institute for Water Security and the Department of Drama for continuing partnerships for knowledge mobilization. Figure-1 (page 7) displays the three stages of the project.

### Transformational Engagement

This project arose from the desire of the principal investigator, Graham Strickert to transform the way that research communication was done with stakeholders in the SRB. In April 2013, we won a grant from the Social Sciences and Humanities Research Council of Canada for an application called “Performing Perspectives of Water Security in the Saskatchewan River Basin.” This grant was fully funded for a one year period. The goal of the grant was to mobilize research results via forum theater. The research results that were mobilized came from stakeholder workshops about understanding water security in the Saskatchewan River Basin from a social science perspective.

### Script Development


In developing the script, we used perspectives garnered from the stakeholders to build the main characters. We worked with a playwright to translate science results into different ‘ways of life’ and perspectives on water security. These translations morphed into characters and representative elements of the water sectors that play out a water crisis during the performance. An example would be the perspective that “Water for all people and animals” morphed into a ‘hippie’ stereotype who pushed for the environmental needs over economic development, and was represented by a fish in a stream. The script went through several iterations over three months. We sought comment on drafts of the script from graduate students, stakeholders, specialists including hydrologists, local experts, an historian, and University of Saskatchewan Socio-Hydrology group members. The script was finalized in February 2014.

### Testing the Efficacy of Forum Theatre

There has been research showing that arts-based outreach and engagement can be an effective alternative to more traditional reporting (Beck et al. 2011). Theater, in particular, can prime deeper dialogue with stakeholders because of its capacity to make people see alternative perspectives. In this project, we tested that theory with a live theatrical performance. We used forum theater (Boal, 1995) which removes the barrier of the actors on stage, and the audience as powerless receptors of the message. Instead audience members are active participants. It was also a crafted social experiment to test whether forum theater could work as a knowledge mobilization and engagement device in water management and research communication. Furthermore, the performance enabled to the collection of data regarding decisions to allocate resources, and focus groups to understand how and why those decisions were made.

### Casting, Rehearsals and Logistics

Actors and crew members were auditioned and cast between December 2013 and January 2014. The set and costumes were designed and built by the Department of Drama staff and students. Rehearsals went from January to February 2014. Faculty and staff members of the Department of Drama were largely responsible for the preparations of the performance piece. The set and costumes were key elements of the research translation. The audience needed to be able to see the progress in terms of allocations to different water management sectors as the crisis in the play unfolded. The set was designed to track the decisions of the audience members in an active and visually-stimulating way with the use of Ping-Pong balls, and transparent containers. The set were custom designed multipurpose containers that transformed in multiple set pieces conveying podiums, game show containers and parts of the boardroom table during the play to convey the setting, while also being portable and sturdy enough to travel to the different venues. The costumes also played a role in identifying perspectives



from the research more clearly for the audience, and in enhancing the empathy that audience members felt towards the characters.

The logistical preparations for the tour included site selection and booking, transportation, marketing, and recruitment of decision makers for each performance. The Social Science Research Laboratory (SSRL) at the U of S coordinate ticket registration and tracking. The venues assisted by using their social networking tools (Twitter, Facebook) to further broadcast the performances. Communications officers for each department assisted in creating key points for media interviews. These points were shared with the cast and crew in a 'media training' session designed to prepare cast members to address the important aspects of the project should they be approached. Cast members practiced media interviews and worked with the project team and communications officers on the delivery of the key messages. Ten official media events/requests were completed between January and May 2014. These included three appearances on local and national radio, interviews with on campus news services, and in articles in local newspapers (see Media section below).

### Research and Ethical Protocol

Ethics approval for the structured data collection was received through the Behavioural Ethics Committee at the U of S. The research protocol and information sheets were distributed electronically through our registration and ticketing web service prepared through the SSRL. We enlisted the services of Education Media and Production (eMap) to video-record the technical rehearsals and pilot performances. The recording is available [online](#) and as a DVD for future workshops and research.

Focus groups occurred at each performance and the recordings of these focus groups were transcribed and coded. Feedback from the audience, focus group members, and project team were broadly based around seven themes:

1. Theatrical engagement was deemed a worthwhile and effective tool for mobilization knowledge about water security
2. Characters were true-to-life and worked to help audience members breakthrough stereotypes and consider alternative perspectives
3. There were some missing perspectives: extreme of environmentalism, reservoir operations, small businesses, federal government, feminist viewpoint, and non-governmental organizations
4. The plot and forum theater design of the play worked to examine ongoing issues in water management at a deeper level than previous workshop engagement efforts
5. There is a desire for this type of engagement to continue, and indeed, this play to tour again and be offered during upcoming conferences/workshops at a national scale
6. There are ways to make this play even better both theatrically, and through research translation
7. A project coordinator was a key element of the team since the grant had a huge scope but very limited time and budget constraints

Decisions made during the performances were similar between the four official shows and one dress rehearsal with two notable differences. The decision makers from Cumberland House were the only decision makers that initially diverted water into the irrigation district, taking action in the first signs of an impending flood. Their actions were more proactive than audiences in the upstream performances. The Saskatoon official performance decision makers chose to restore fish habitat post-flood while others chose to riprap the banks prior to the flood. This might indicate a more environmentally-aware audience, particularly since a majority of the audience were faculty and students in a school with sustainability as its key focus. We conveyed the message two key messages to audience members and decision makers 1) there are decision that need to be considered for the downstream communities and 2) stakeholders throughout the basin needed to use resources wisely to ensure preparedness for uncertain downstream effects. The decision makers also noted an increased sense of empathy towards actual water managers and decision makers through their experiences of having to make decision within constraints, and by hearing messages by different sectors with conflicting interests.



## Post Tour Debrief

After the tour was complete debriefing sessions occurred with the project team including the playwright, actors, crew, and faculty members in April and May 2014. Debriefs were open conversations focused on pragmatic ways of improving the process of implementation of similar projects. Major obstacles in this project included limited time and resources, a need for an expanded stakeholder engagement process in script design, the need to workshop the script with actors and the research team including the playwright prior to implementing rehearsals, and having the faith to do this untested translation of water security research into theater. The benefits of the project included widespread social learning, creating an interdisciplinary team that worked well together, sharing messages from stakeholders with the audience through direct inclusion in the script and through upstream-downstream communications, trying a new method of engagement, providing experiential education for the students, and interacting with students/faculty from different disciplines. It was important to this project that the timing of the active stage of the preparation for the show fits with the curriculum and scheduled performances put on by the Department of Drama. It was also significant that the director and researchers nurtured a relationship that had as its core, strong commitment to the project's success, and were also open to constructive criticisms to help bridge the disciplinary divide between water sciences and performing arts. The research team were able to leverage the complementarity between the disciplines and their students to make the project work.

The budget of the project was \$45 843 (CAD). The project closed on budget. Budget changes included abandoning the translation to Cree as it was deemed technically too difficult due to local dialect issues and a lack of available translators, and deemed unnecessary by the community. We decided to use the funds for having the video produced through eMap instead. eMap produced three items: a 4-minute trailer to introduce people to the project, a video for schools to use with upper level students, and a video of the actual performances with actual audience decision making included. The contract for the postdoctoral fellow was extended by one month to allow for reporting and a draft manuscript to be produced. We also allocated more funds to travel since we required a large cube van rental to transport the set.

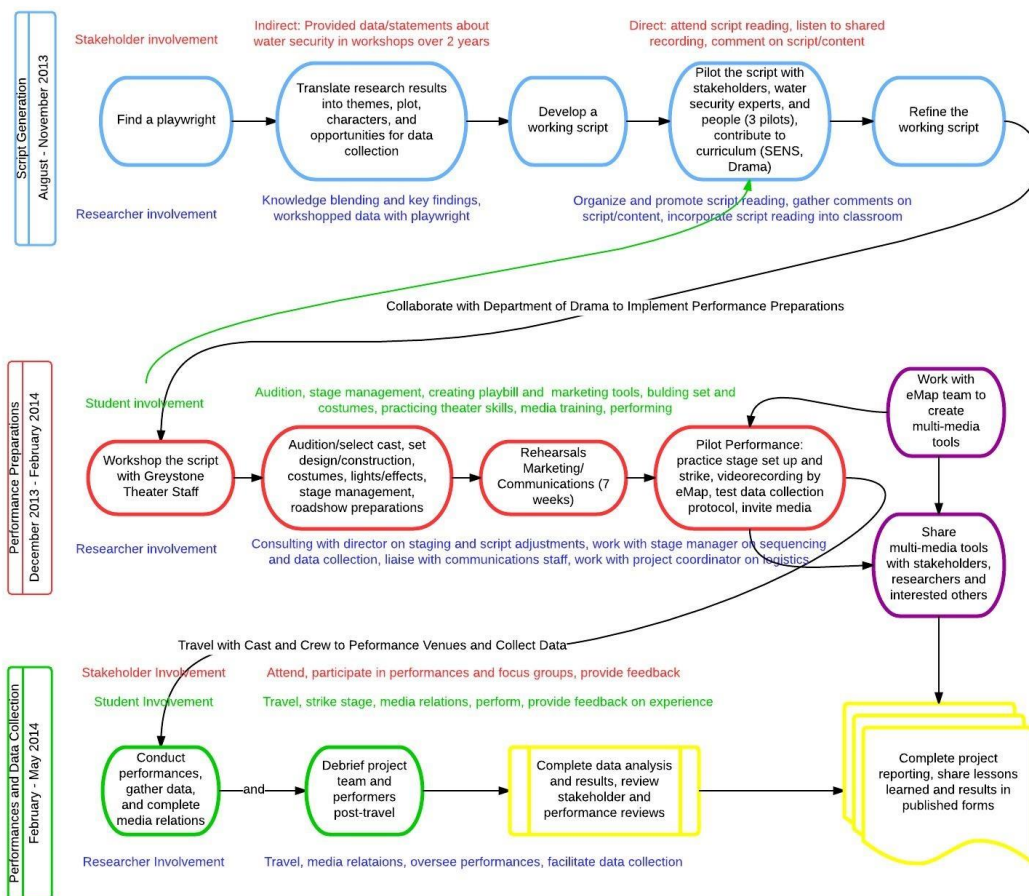
There are possibilities for future collaborations. These include plans to investigate the feasibility of working with the Department of Drama, Arts Councils, First Nations communities, and other departments on campus to build a large-scale SSHRC Partnership or Insight Grant geared at examining the systematic framework for conducting knowledge mobilization through performance arts. We also seek to produce manuscripts from the work as follows:

1. A manuscript examining the benefits of the experiential aspects of a touring show focused on knowledge mobilization for upper-level undergraduate drama students
2. The investigation of social learning among distal interdisciplinary collaborations through art-based knowledge mobilization
3. The use of theater as a means for knowledge mobilization in the water management sector

In summary, this project met all its requirements and goals, within the budgetary and time constraints. It was a successful collaboration across disciplines at the U of S, and directly involved stakeholders in the SRB in project conception and development, research at the micro- and meta-levels, and feedback among research team members, support staff, and stakeholders of the SRB.



Figure-1 Downstream Process and Engagement





## Background

The gap between research, policy and practice is often described, both in the arts and the sciences (Champagne & Lemieux-Charles, 2004; Nutley, Walter & Davies, 2007; Cooper & Levin, 2010). The search for ways to strengthen the connections between researchers and society, and thereby improve the contribution of research to policy and practice is occurring across sectors, disciplines, and countries (Levin, 2008; Sin, 2008; Cooper, Levin & Campbell, 2009). Indeed, the focus of the Connections Grant program of the Social Sciences and Humanities Research Council in Canada (SSHRC) is on 'knowledge mobilization' – the multi-directional flow of research knowledge across academia and society as a whole in order to inform Canadian and international research, debate, decision, and actions (SSHRC, 2014).

*Performing Perspectives on Water Security* — was aimed at connecting and collaborating with stakeholders who are engaged in the management of water in the Saskatchewan River Basin (SRB). We understood from our previous work in the SRB and through reviews of the literature that effective water governance is impeded by divergent and often competing perspectives of scientists, managers, and other decision makers (Larsen et al., 2009; Ascher et al., 2010; Parker & Crona, 2012). We decided to use iterative engagement with two-way flows of information about perceptions of water security in order to create interactions that would bridge science-policy gaps, and start a conversation with society as a whole about how to achieve effective deliberative processes for improving water security in the SRB. To do so, we wanted more than an outreach activity; we wanted to create a social process that could really examine science-policy engagement and be its own social science inquiry (as per Jacobs et al., 2010; Dilling & Lemos, 2011; Crona & Parker, 2012).

Recognizing the benefits of arts-based approaches for conducting and disseminating research in various disciplines (Kerry-Moran, 2008; Cole & Knowles, 2008; Rossiter et al., 2008; Beck et al., 2011), we partnered with the Department of Drama. We sought to co-produce a theatrical performance with built-in social science research components to take on tour across various communities in the SRB. Theater engages audiences on a cognitive and emotional level. By using verbal and non-verbal communication, theatre has the potential to enhance water people's understanding of the complex emotional, interpersonal, inter-jurisdictional, and psychosocial dynamics that arise in water management deliberations. Working from the theatrical perspective allowed us to present the struggles of transboundary water decision making through representational forms in characters and plot-lines based on what the stakeholders told us over two years of workshops and study. It also allowed the researchers and the artists (script-writer, performers, directors, and support staff) to create an engagement experience that engendered more interest and action for change around the water security dialogue in the Prairies – a complex and critical social issue (Gergen and Gergen, 2010).

### Social Learning

Social learning was an important component of the project. Social learning is broadly defined as an interactive and iterative process of sharing and reflection on ideas among different people (Keen et al., 2005; Armitage et al., 2008; Berkes, 2009). The students, researchers, support staff, and project sponsors all gained more insight into water management, knowledge mobilization, and stakeholder engagement through this endeavor and by doing so, share that knowledge with a wide group of peers.

We translated the perspectives gleaned from survey, Q-methodology, focus group, and mind-mapping work with stakeholders in the SRB into characters and representations of perspectives through a playwright, research associate, and postdoctoral fellow specializing in knowledge mobilization. The playwright helped the researchers learn one method of adding meaning to research results through personification of perspectives into characters in a play. The characters and plot for the play needed to be legitimate for buy-in from the stakeholders. In the social sciences, the key tool for interpretation of the data is the researcher; in this case, we expanded that tool to include the postdoctoral fellow, and the script-writer as well for increased legitimacy. This allowed for even more perspectives to be considered when drafting the characters of the play, and for increasing the exposure of the research team to alternative interpretations of the data. The script was revised several times after script-sharing and organized readings with various SRB stakeholders, and experts in hydrology, meteorology, and local communities. This modified Delphi technique (Walker & Selfe, 1996) sought to increase the salience and





credibility of the performance. Once finalized, the Department of Drama took over the production aspects of the show and we set to work with the marketing and planning of the roadshow.

This report continues by presenting the specifics of each process involved in the grant and reporting on the results of the research associated with the performances. We begin by explaining the process of developing the script, preparing for the performances, and organizing the data collection. We continue with the logistics and measures of performance success, and finish with lessons learned and a discussion of future opportunities.



## Script Generation

In consultation with the Department of Drama we hired playwright-in-residence Kenneth T. Williams to produce the script for us between August and November 2013. We gave him a copy of the SSHRC grant application, reports from water security workshops, results from our data analysis and draft manuscripts. . We briefed Ken about cultural theory, human dimensions of water security, the characteristics of the SRB, recent events that could contribute to the plot, and then we discussed our goals for the play. We wanted an engaging, interactive event where we could also examine the dynamics of decision making and recruit audience members for post-performance focus groups.

The playwright worked frequently with the project team to understand what the results of the workshops meant in terms of human interaction. He also clarified the components of cultural theory and made suggestions for plot and characters. We met in August 2013 to discuss his ideas for the plot. He suggested that we design the play around a 'forum theater' event. Forum theater originated with Boal (1995), and is a type of theater that acts as a forum to help people understand how they can change their world (Schutzman and Cohen-Cruz, 1994; Brown & Gillespie, 1999). In forum theater productions, audience members are considered actors and can direct the way the play reaches its climax through various processes (Boal, 1995). In the ideas for the production for the grant, the playwright suggested that the audience members could be involved in making allocation decisions during numerous critical occasions in the performance, based on arguments presented by 'stereotypical' water stewards in a board room setting. These decisions would direct the outcome of the play which would be based around a water crisis (i.e., flood, drought, toxic spill, others).

Working with the researchers, the playwright developed six main characters, each with an alter-ego: the characters represented various personas that appear in board-like settings and very much typify the 'ways of life' as described by cultural theory and that were observed during stakeholder workshops. Each of these personas turns into a key element of the water management 'sector' during the crisis of the play and must defend the decisions to spare them the disastrous consequences of the water crisis. The defences are presented using typified language and some direct quotes from stakeholders that came to the workshops. Each character pleaded to the audience for protection of their sector and argued with the other actors who presented counter-arguments. After each actor spoke the audience members were to coerce a group of key decision makers to make decisions on what actions to take in terms of resource allocation with limited resources.

To reflect salient issues in the SRB, the script was designed around a flooding scenario. The plot opened with a 'stewardship board' meeting to come up with a drought management plan. During a break in the meeting it is made apparent, that a major flood event is occurring and the board had no plan in place for such an event. They spend time 'acting out' what scientists have said about climate change and the fictional basin they are living in. Then the board 'transforms' into stereotypical characters who represent critical elements of the water sectors. These characters put the task to the audience to decide which elements to protect through allocation of resources. Statements about protection of the sectors were taken from direct quotes from transcripts of workshops, survey data, and stakeholder feedback sessions. Missing voices from the debate are included in the plot through direct and indirect referencing. Key decision makers and audience members use Ping-Pong balls to distribute their resources. This is an active process where decision makers must deposit the balls into containers on stage and audience members can see the record of their decisions throughout the performance through the set design. The plot returns to the board table at the end to make guiding statements about collaborative and meaningful water management in the basin.

The draft script was shared with stakeholders in the SRB; first, a graduate-level class on the Human Dimensions of Environmental Change in the School of Environment and Sustainability conducted a script-reading with the playwright as an activity designed to expose students to pluralistic democracy as well as construction of narratives, and issues of power and privilege in Canadian society. This reading also served to help the playwright test how the perspectives were coming through in the characters and text. The script underwent more revisions after this initial reading.

The script was then shared with stakeholders in a reading performed by students from the Department of Drama. This reading was attended by 10 stakeholders, but was also audio-recorded and shared electronically with the



Socio-Hydrology Group of the U of S, and other stakeholders who could not attend in person. Comments were provided by these members for the playwright, coordinator, and producer to revise the text and the plot.

In consideration of the feedback we received from several stakeholders in the headwater community, the script was significantly revised to be less satirical about the impacts of a flood. With consideration, a decision was made to cancel the performance in the headwater community that had been affected by a recent flood. In hindsight, there were regrets about not going to the initial communities because of the ability of the performance to empower local people as was reported by audience members.

The script was also altered to reflect a more accurate portrayal of the hydrology associated with the basin. Resource allocation options were revised to reflect what was more realistic during the flooding event, and to better reflect the order that each sector could be impacted in the fictional basin. We also wanted to have First Nations voices included in a more meaningful way. The script was sent for final comment in December 2013. It was completed by January 2014 and allocation decision scenarios were finalized in early February 2014 with the help of an expert committee of hydrologists.

Upon reflection with the playwright, he noted that the script was created very quickly and would benefit from more time for reflection and refinement. Normally scripts for this type of are composed over the course of 1-2 years. The three month turnaround on this script was a result of the commitment and enthusiasm of the team involved. More about the lessons learned on this process are reported below in the Lessons Learned section.

## Performance Preparation

In December 2013 we planned the tour dates and locations. We finalized the schedule as per below:

Table-1 Schedule of Performances

Dates	Location	Performance Venue
February 16 <sup>th</sup>	Saskatoon	Convocation Hall, 2 dress rehearsals with audiences
February 18 <sup>th</sup>	Calgary	Fort Calgary
February 19 <sup>th</sup>	Medicine Hat	Medicine Hat Library
February 21 <sup>st</sup>	Saskatoon	Convocation Hall
February 24 <sup>th</sup>	Cumberland House	Charlebois Community School

This schedule was necessary to hire student actors from the Department of Drama since we needed them to be free to travel for the performances and this was only possible during the February 2014 reading week. The performance also had to be complete in February to allow the students adequate time to prepare for other performances and final exams. Future collaborations could work the performances into curriculum and course credit so as to not unduly burden students, staff and faculty of the Department of Drama.

Auditions for the roles were held in December 2013 with director Natasha Martina from the Department of Drama. The cast consisted of seven actors and three crew members; an assistant director who travelled with the show, stage manager, and lights/sound technician. All of the cast and crew were undergraduate students from the Department of Drama. The cast and crew attended 80 hours of rehearsals, 2 hours of media training, 1 hour of script reading for recording purposes, and were also trained to set up and strike the stage for each performance.

Set, prop, costume design and build were completed by staff at the Department of Drama with \$22, 415 (CAD) in resources provided by the Department of Drama as follows:

- Director's salary: \$5000 (CAD)
- Rehearsal space: \$395 per day for 14 days = \$5530
- Two workshops for technical crew = \$1070
- Dress rehearsal technicians and space = \$1540
- Set, Prop, and Costume construction materials: \$4675; labour and benefits: \$4600

Two brainstorming sessions occurred with the project team in late January and early February 2014. The set was constructed to be transportable in a cube van for the touring show. The set also included a rear-projected screen so that the scenery, important quotations from workshops, and decision making options could be viewed by the audience during the show. Two professional photographers donated images for use during the show and these appeared on the playbill. The playbill was designed and compiled by the assistant director with input from the project team (see Appendix-1).

A poster-sized map of the Saskatchewan River Basin was created to help audience members learn about the breadth of the basin, and as an arrival activity for the audience. It was displayed on a table in each theater and audience members were asked to sign their names on the map if they wanted the people living downstream to know that they cared about them (Figure 2). Audience members were free to sign this map before or after the performances.

Figure-2 Map of the Saskatchewan River Basin



The project coordinator booked accommodations and arranged travel for the group. The Risk Management office on campus was briefed on the project and tours, and forwarded required documentation from each tour member. Appropriate policies, driving permits, and travel plans were established for the tour.

After the tour, the project coordinator arranged payments for student salaries, per diems, and reimbursements for the accommodations and vehicle rental. The set was stored within the Department of Drama, and debriefing occurred. Recordings of performance decision making and focus groups were transcribed and report requirements were compiled. The project coordinator liaised with the Office of Research on campus to ensure SSHRC year-end financial reporting was completed.

## Performances

Five live performances occurred between February 16<sup>th</sup> and 24<sup>th</sup> 2014. We started the tour with a full-day technical rehearsal in Convocation Hall at the University of Saskatchewan. During this rehearsal, the cast and crew performed the play with audiences for two of the performances. The cast and crew also had to set up and strike the stage for each of these run-throughs to prepare for the tour. The rehearsal performances were videotaped by eMap. The second performance was opened to the public to allow those who would not be able to attend the scheduled performance on Feb. 22<sup>nd</sup> at the University to view the show. The summary of attendance and the key decision makers for each show is below in Table-2:

Table-2 Performance Attendance

Performance Location	Number of Audience Members	Characteristics of Key Decision Makers
Saskatoon Dress Rehearsal	31	Emergency Forecasting Meteorologist Professor of Drama 3 Drama Students
Calgary	49	Stakeholder Engagement Officer Water Resource Specialist Research Chair in Physical Hydrology Oil Sands Electrician Forestry Industry Specialist
Medicine Hat	5*	Watershed Planner College Professor Researcher Student Assistant Director
Saskatoon	108	Toxicologist Director, Local Biosphere Reserve Water Resource Engineer Executive Director, Safe Drinking Water NGO Aquatic Biogeochemist
Cumberland House	210	Guide, Fisherman and Trapper Elder 2 High School teachers
Totals	401	

\* This performance occurred during a snowstorm and could not be rescheduled.

We aimed to have a variety of individuals with different experiences and expertise as key decision making teams for the shows. This was to gauge how the different experts would interpret and react to each decision point, as well as speak for their sector with regards to the salience of the performance.



## Media Coverage

Below we detail the media coverage arising from the *Downstream* production.

Date	Source	Person(s)	Title	Link to media item
7-Feb-14	On Campus News	Graham Strickert, Lori Bradford	<i>The Drama of Water Research</i>	<a href="http://words.usask.ca/news/2014/02/11/the-drama-of-water-research/">http://words.usask.ca/news/2014/02/11/the-drama-of-water-research/</a>
13-Feb-14	Radio Canada International	Graham Strickert	<i>Overcoming the scientific language barrier through art</i>	<a href="http://www.rcinet.ca/en/2014/02/13/overcoming-the-scientific-language-barrier-through-art/">http://www.rcinet.ca/en/2014/02/13/overcoming-the-scientific-language-barrier-through-art/</a>
17-Feb-14	The Sheaf	Graham Strickert	<i>U of S Play Downstream Tours the Prairies</i>	<a href="http://thesheaf.com/2014/02/17/u-of-s-play-downstream-tours-the-prairies/">http://thesheaf.com/2014/02/17/u-of-s-play-downstream-tours-the-prairies/</a>
18-Feb-14	Medicine Hat Library Twitter Feed and website news	n/a Library official twitter feed and website	<i>Come see Downstream</i>	
19-Feb-14	Mississippi Broadcast Corporation	Graham Strickert	<i>Water-security play to be performed in Cumberland House</i>	<a href="http://www.mbcradio.com/index.php/mbc-news/13478-water-security-play-to-be-performed-in-cumberland-house">http://www.mbcradio.com/index.php/mbc-news/13478-water-security-play-to-be-performed-in-cumberland-house</a>
21-Feb-14	CJWW/Saskatoon Homepage	Graham Strickert	<i>Water Theatre</i>	<a href="http://www.saskatoonhomepage.ca/water-theatre/itemid_21">http://www.saskatoonhomepage.ca/water-theatre/itemid_21</a>
21-Feb-14	CBC Radio Saskatoon Morning	Graham Strickert	<i>Downstream</i>	no clip available
21-Feb-14	Global Saskatoon Morning	Graham Strickert and Chris Donlevy	<i>Downstream -Water security play intrigues Jessica</i>	<a href="http://globalnews.ca/news/1164536/blog-morning-news-rewind-feb-21/">http://globalnews.ca/news/1164536/blog-morning-news-rewind-feb-21/</a>
24-Feb-14	CJCF Radio - Cumberland House	n/a	<i>Advertising event</i>	
23-May-2014	UofS Arts & Science Magazine	Graham Strickert, Natasha Martina	<i>Downstream makes a splash</i>	Page 6 <a href="http://artsandscience.usask.ca/magazine/pdf/A-S_Spring2014.pdf">http://artsandscience.usask.ca/magazine/pdf/A-S_Spring2014.pdf</a>

The research team and project coordinator worked with departmental communications officers to create five main messages that were provided during media interviews. These key points were shared with the actors and crew during their media training to help them prepare for any interactions on tour. These messages also were important for social learning among the team and for grounding the media about the play in legitimate background research.



## Results from Performance Decision Making

At each performance, three to five members of the audience acted as key decision makers. These audience members were contacted before the show and asked to be a part of the research. They were selected based on their roles in water and stakeholder management in the SRB. These decision makers were instructed that they would make decisions about resources allocation. Before making their decisions, however, they would hear arguments presented from different characters, the audience's demands, and could draw on their own personal experiences.

Each of the decision makers were given a bag of 40 Ping-Pong balls which represented flood management resources that they could allocate to assist in reducing the damage of the flood on particular sectors: an irrigation district, fish habitat (representing ecosystems), a water treatment plant, a golf course, a prairie town, oil wells, and a First Nations reserve. The decision makers had limited knowledge of the situation in each decision making scenario (scene in the play), limited time to make the decisions, and limited resources. They could not simply select the best strategy for each case in the play or they would run out of resources.

We designed the decision points of the play to mimic what it is like to make water management decisions in the SRB. We also wanted to keep other audience members engaged so we gave each person one Ping-Pong ball as they entered the venue and told them they would be needing it at some point during the show. During select decision points we allowed audience members to donate their resource to the 'cause'.

Each decision point had 2 – 4 strategies to choose from. The total amount of balls that the decision makers started with was 200 balls, however, to do all of the most costly strategies over the course of the performance would require more than that. Audience members also had one ball each they could contribute. Thus, within the entire audience there were more resources available than the initial 200, but only as many as there were people present which mimics actual scenarios of resources available in emergencies. Table-3 below indicates the options, cost, and actual decision making in each performance location. The respondent codes represent their location as follows:

SD# - decision maker in the Saskatoon technical rehearsal  
C# - decision maker in the Calgary performance  
MH# - decision maker in the Medicine Hat performance  
S# - decision maker in the Saskatoon performance  
CH# - decision maker in the Cumberland House performance

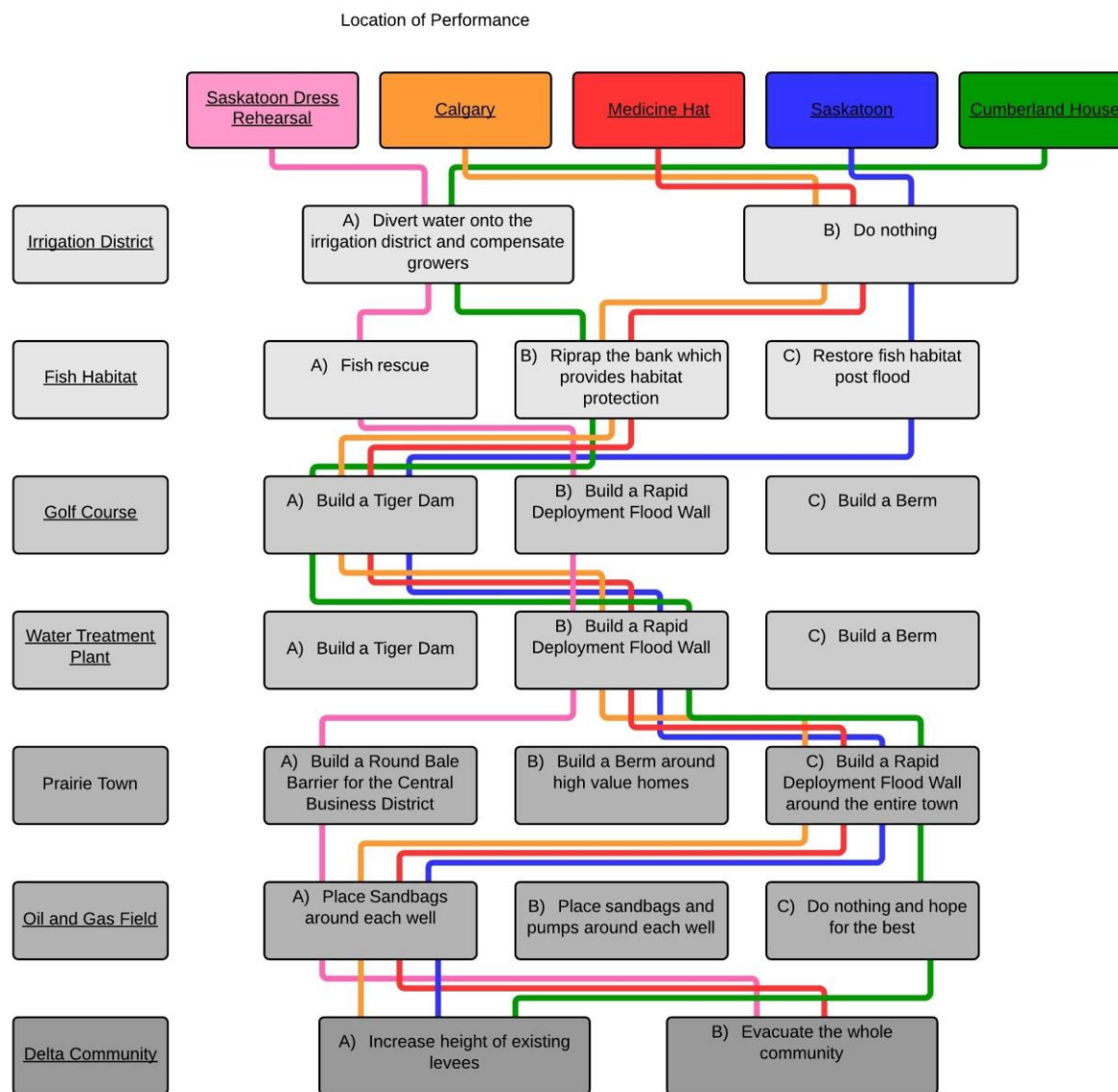
Table-3 Allocation Decisions by Location:

Decision Point	Options	Cost (Ping-Pong balls)	Actual Decision in each location				
			Saskatoon1 Dress Rehearsal	Calgary	Medicine Hat	Saskatoon2	Cumberland House
Irrigation District	A) Divert water onto the irrigation district and compensate growers	50	A	B	B	B	A
	B) Do nothing	0					
Fish Habitat	A) Fish rescue	15	A	B	B	C	B
	B) Riprap the bank which provides habitat protection	30					
	C) Restore fish habitat post flood	40					
Golf Course Club House	A) Build a Tiger Dam	20	B	A	A	A	A
	B) Build a Rapid Deployment Flood Wall	30					
	C) Build a Berm	40					
City Water Treatment Plant	A) Build a Tiger Dam	20	B	B	B	B	B
	B) Build a Rapid Deployment Flood Wall	30					
	C) Build a Berm	40					
Prairie Town	A) Build a Round Bale Barrier for the Central Business District	30	A (12 balls donated by audience members)	C	C (13 balls were donated by audience member)	C (15 balls donated by audience members)	C (20 balls donated by audience members)
	B) Build a Berm around high value homes	40					
	C) Build a Rapid Deployment Flood Wall around the entire town	90					
Oil Well	A) Place Sandbags around each well	40	A	A	A	A	C
	B) Place sandbags and pumps around each well	80					
	C) Do nothing and hope for the best	0					
Delta First Nations Village	A) Increase height of existing levees	60	B	A	B (32 balls donated by audience member)	A	A (23 balls donated by audience members)
	B) Evacuate the whole community	90					

Points of difference in the decision making are highlighted in the table. It is also important to note that although decision makers initially had 200 balls, we scripted the oil well 'tycoon' to have hidden resources available to protect his oil fields (as we heard during the pilot workshops that that industry should have the resources to protect themselves and make enough profit to do so). We also scripted a government matching program for the delta community, and we encouraged audience members to contribute their resources in each decision point if

they felt they wanted too. In each performance, decision makers used up all their available resources. Figure-3 displays the decision making involved in the play by location:

Figure-3 Decision making by location for *Downstream*



We recorded the debate among the key decision makers during the play. We then investigated what the drivers were for their decisions in the focus groups and summarize these with key quotations below in Table 4:

Table-4 Actual Performance Decision Making Drivers

Decision Point	Key drivers	Supporting quotations
Irrigation district	For those who chose to divert the water: The debate centered on the feeling of wanting to act, lessening the downstream impacts, and having more upstream storage for the future. The impacts to the individual farmers were seen as less severe than the expected impacts to the other sectors.	"Well, we can't just do nothing." SD1 "On the other hand, diverting water into low-lying areas is one of the few ways that you can actually manage a flood" MH1 "Upstream storage is very nice if it's raining in the mountains." MH2
	For those who chose not to act: The choice of doing nothing was driven by initial confusion of how the game works, and by the inability to come to a decision as a group – the decision makers turned to the audience and held a vote.	"Do we make decisions alone or are we supposed to work together?" C1 "But we only have 40 balls and there's lots of other places downstream." MH1 "Let's poll the audience." C3
Fish Habitat	The decision for fish rescue was driven by cost.	"We should do something but we need to save balls for later." SD3
	The decision to riprap the bank was driven by the desire to protect the environment, and the flow-on effects of protecting one species on the ecosystem as a whole. There was also the mention of how it was nice to have a 'middle ground' choice for decision makers.	"I think the fish are sort of an indicator species of healthy waters so I think we should put a lot of eggs in that basket" MH1 "There's subsidiary benefits of restoring habitat too." MH3 "This isn't as hard a decision, we can choose a middle ground." C2 "It protects from erosion too. I'm good with that." CH2
	The decision to do fish rescue post-flood was driven by the desire to have an effective solution and by empathy with the actor's performance.	"Option A and B don't help enough. We need C. We need to save all the fish. Especially the big ones." S5 "I was biased because I just loved the fish [the character], every time I looked at the fish *laughter* you know, so that was one of those things where I almost waited for the fish to say something." S1
Golf Course	The Tiger dam decision was driven by the idea that a golf course was not essential to protect.	"Golf course definitely is a luxury" C1 "Not essential." C2 "Golf courses, you know regardless of the subsidiary benefits, are pretty low priority in my head" MH2 "I'm in the low-balling camp on this one." S4 "I've seen those dams work quite nicely." S2 "We can say its [choosing option A] because we want to save some money." CH4
	The rapid deployment flood wall decision was driven by a different approach to decision making amongst the key decision makers: each decided to donate a number of balls to the cause instead of choosing a particular option.	"I think it's only worth five balls." SD1 "I think its more, maybe ten." SD3 "Okay, we've got 25, no, 30. We'll go with B." SD4
City Water Treatment Plant	The decision to use a rapid deployment flood wall was driven by the perception that clean water was essential. The decision was also driven by some decision makers experience with the strategy. The downstream community made the decision to try and lessen the contaminants that would come to the delta.	"Clean water is essential." C1 "Well I know what the city of Medicine Hat is doing, they're going to do the berm. They're already stockpiling the supplies." MH3 "Well, we need clean water to drink. It's essential." S5 "Everything's going to come to us. We're getting all the contaminants if their structures get destroyed." CH1
Prairie Town	The decision to build the round bale barrier for the town was driven by the lack of resources the decision makers had left.	"We don't have enough for B or C." SD1 "But we need to do something, right?" SD2


	The decision to build the rapid deployment flood wall around the entire town was driven by the desire to act fairly to all the townspeople, not just the high value homes.	"A or C." C1 "I'm with you on that. Scrap B." C2 "And I'm sort of philosophically opposed to protecting only the high-valued homes. That rubs my socialist soul the wrong way" MH2
Oil Wells	The decision to use sandbags was driven mainly by a lack of resources at the point in the game and by the perception that industry should use their own resources to protect their interests.  <i>Note: the decisions for allocation of resources for the oil company occurred in partnership with actor who had up to 40 balls of his own to allocate in this instance.</i>	"We can't afford pumps." C3 "We've gotta worry about the delta" MH1 "I'm thinking that if the industry is so profit oriented it could probably afford an investment in flood protection, both now and in the future. I mean so the guys who are doing the sandbags need time and a half. Or double time..." MH1 "How many billion was BP able to cough up after a minor disaster as sitting there waiting to be squeezed out of them? If it's so important to protect the wells and protect the waste dumps, the industry will find a way of doing it. I think that's economics." MH1 "We need to save our resources for the delta. " SD2 "Buy your own pumps and sandbags." SD3 "In real flood situations how much do those companies do... whether they do put in enough resources to take care of their things properly like pumps and sandbags, and also whether they help the other stakeholders like the community and things like that because I know a lot of them do have community investment." S3 "We don't have any resources left" CH1
Delta First Nations Community	The decision to raise the height of the levee was driven by not having the resources to do more.  The decision to evacuate the community was driven by the need to treat everyone fairly and by the economic potential of the area. <i>Note: government and community donations were given.</i>	"How much have we got left? We've only got 20." CH1 "We really didn't plan ahead well." C2 "If the levees work it's the way to go." S2 "I don't know if they would want to be evacuated, we should talk to them first." S3  "And our heart strings went bloop bloop for the prairie town..." MH2 "Think of the tourist potential... town's destroyed whose going to come for bird watching at the delta" MH3 "If we have any left we should give them to the community too, for every flood they been through in the past." SD4

#### Analysis:

The play worked to put the key decision makers into situations mimicking learning from the water security workshops. The decision makers told us that it was difficult to make decisions with incomplete information, and while being 'bombarded', as one decision maker described it, by messages from the audience, pleading from the sectors (i.e., actors in this case), and with limited resources and time pressure. Exposure to this environment helped the decision makers in the play empathize with other stakeholders in the water management sector, and with water governance in general.

The focus group discussion for the first two decisions points in the performance centered on how to make a decision including whether to consider local needs, sector needs, and/or the effects of the decision on the whole watershed. One set of decision makers turned to polling the audience for each decision as a strategy. Another group made individual decisions about how much they were personally willing to contribute for a sector, then adding up their donations to see which strategy they could afford. The third and fourth groups relied heavily on their experience to guide their decisions. The initial 'testing the waters' and figuring out how the forum theater game was going to work for them is akin to what is described in theories of decision making under uncertainty (see for example, Klein 2009; Lui et al., 2011). Heuristics were at play; the idea that they had to be seen as doing something, and maintaining the image of being united or working together for decision making emerged. As was reported in workshops, decision making by water management groups is often contentious and disorganized at first, and also different from location to location. One of the challenges for the GIWS moving forward is to help develop a protocol for decision making that could be followed across the entire watershed that is still locally-relevant and adaptable.





As the play progressed, the key decision makers asked more questions to the facilitator and discussed their options more thoroughly. Several were frustrated at having to choose among the assigned options and not creating their own plan; they wanted the freedom to innovate or consult with community members and experts. Limiting the decision makers to two or three options was frustrating for them; one noted that there didn't seem to be much variety in the choices (for example, a berm, and rapid deployment dam, and tiger dam were just three variations of the same strategy). Another pointed out that the options were mostly reactive, and had no long-term viability. In another iteration of the play, a longer-term outlook and scenario should be considered. A future research opportunity could be to look at the various time-scales and options for flood management and develop a decision support tool for boards to use.

## Results Summary

Decision makers for the Saskatoon dress rehearsal, and in Cumberland House made different selections than their counterparts in the other three performances. We believe the experiences of the Cumberland House community with ongoing flooding and response issues, and from living 'downstream' influenced their decision making – which included diverting more water initially, and refusing to support industry in their needs.

Decision makers said that through the scenarios in the play, they were forced to have deeper conversations about trade-offs in water management than they would while filling out surveys or in workshop settings. The focus group respondents noted that even though the characters in the play were stereotypical, the decision makers could cut through the actor's personae to the validity of the arguments they were presenting. One respondent said "I think they were largely caricatures, and it was funny to hear some of the criticisms of those because I didn't take any of the characters seriously, [but] I think you know some of the messages they were relaying had truth." This made them overlook the more subjective opinions of the luxury of the golf course, and the high value homes in the town, to debating what the downstream effects would be of their decisions.

Decision making styles practiced by the groups in these performances ranged from using more rational-analytical cost-benefit analyses to relying on one's experience and option awareness. The decision makers noted that sometimes they sought consensus or a majority among audience members, while others times they went with affectively-motivated choices (gut feelings). Even with the different decision making styles among the performances, there was still alignment with decision between the different locations. More investigations into how different styles of decision making play out among water management boards would benefit the GIWS's work on understanding socio-hydrological aspects of water management decisions.

The plot and script of the performance were able to guide the decision makers through the scenario in a predictable way. Studying how the script did so would benefit researchers so they could better understand what drives decision making across a variety of scenarios. By doing so, simulations could be developed that could facilitate learning and reflection among researchers and decision makers in the basin.



## Focus Group feedback on the Performance as Engagement:

The focus group members were first asked to describe how they felt about the play in terms of how it reflected what they believed happens in water management; that is, how salient, credible, and legitimate they felt the performance was. Overall, they felt the play was an entertaining, thoughtful, and unique way of relaying the information. They especially appreciated the interactive nature of the decision making, and that audience members could be involved too. The humour was well-recognized, as was the beneficial nature of having a 'live' performance. Their general comments included:

### Calgary comments:

- "Pretty entertaining" "It's refreshing to not have death by PowerPoint, thank you"
- "The interactive portion of it was excellent"
- "It made one think of our Saskatchewan neighbours"
- "That was a very unique way of presenting the challenges of managing a many stakeholder operation"
- "I really like this, how you had the audience involved, that was fun. It wasn't just a talk at you drama, it was get you thinking, get you involved, I think it was a really smart way to do it."

### Medicine Hat comments:

- "I think it's great you know, having sat through the board meetings of [Watershed Association], you covered at least as much in this hour as we have in the last 2 years in a much more memorable fashion. Just thinking of reading the statements that you guys have come up with, not to decry them. Yup in terms of public education, this is one way to go."
- "I thought it was interesting, well more interesting than having someone just rail off statistics and different views at you so."

### Saskatoon comments:

- "You could see us discussing things and playing things out. That was much more engaging I think."
- "I agree it's a good way to do it, and it's a different way to do it and um yeah I just think its innovative and it's good to bring a lot of perspectives or a good way to bring a lot of perspectives into the whole decision-making on water security."
- "I think it really catches the dynamics of a board trying to make decisions around a table, and uh it's never cut and dried how people make decisions and they always bring their personal I guess part of the decision-making into it, and uh it's really hard to get people to think collectively about the same thing and not like I say bring their personal into it, what's going to benefit them."

### Cumberland House comments:

- "We're all a part of this and we're all affected by it and its very, very good to have the audience and everybody to participate in this because it all affects everybody."
- "I agree and especially when we got to poll the audience, because that included more people not just decision-makers, and that uh by seeing faces also its sort of like oh that person's in favour so that might have influenced my decision."

Participants described some of the challenges they had in making the decisions. They often felt limited by the choices they were given and wanted to have the freedom to do something other than was listed, or have the option of doing nothing at each point. Decision makers found that it was difficult to prioritize and choose between three things: the impacts to the sectors that directly affected people (the town, the water treatment plant, and the delta village), the lessening of downstream effects, and the feeling that flooding was a natural part of the cycle and regenerative for the environment.

In the focus groups, the decision makers described how effective they thought the scenarios created the atmosphere of a board making these decisions:

- "I think it's pretty realistic that there is competing interests, and whether it's directly accurate about whether they're necessarily butting heads directly all the time is maybe not true. But I think it's accurate in that it



portrays you know the fact that here's my side of the story and here's how it effects you and you might not like it." C2

"Yeah I mean I think it puts the audience in position to have to make actual decisions based on the divergent viewpoints and I think that's the position that policy makers are going to end up in." C4

"I think most of the key points about the challenges of water management were touched on but , its, you know that complexity and how do you actually tackle it remains the big questions... I think it just illustrates it to a lot of people who haven't had to make those decisions before" S5

Overall, the feedback from the focus groups was that the performance was an interesting, legitimate, and effective tool for learning about the challenges of making decision on water management in a river basin.

## Project Accounting

Projected and actual budget May 2013-May 2014:

Items	Budget	Actual	Explanation
Personnel			
1. Actors	14452.00	11152.00	Only 10 members of cast/crew as scripted (not 11 as projected prior to script writing)
2. Postdoctoral fellow/Project Coordinator	10000.00	14253.36	The Project Coordinator continued for an extra month to complete project account close and begin reporting and drafting papers
Playwright Contract	10000.00	10049.00	
Travel – research team	2297.00	780.00	Did not require travel to Canmore, AB.
Travel – actors and crew	5594.00	7401.52	Increased cost of rental of cube van for transporting the set, and gas/mileage for other vehicles
Computers/Software	0	297.10	Hard drive and software were required for the background imaging part of the set, and to work on the video production with eMap
Translation/Interpretation	2500.00	0	Deemed technically too difficult, no available translators with the correct dialect, and community deemed it unnecessary as everyone in the community speaks English
eMap video production	0	1855.00	Production of a video of the performance for dissemination in lieu of translation. Allows for increased access to the performance by interested groups
Hospitality	500.00	55.02	One working lunch. Script readings were done remotely via Skype and file-sharing recordings.
Promotion and Dissemination	500.00	0	Used freely available forms of promotion and dissemination. SSRL hosted registration and ticketing platform at no cost.
Totals	45843	45843	



## Lessons Learned

The process of conducting this grant provided several key lessons for us as we move forward with novel knowledge mobilization efforts. Our debriefing meetings with the project team garnered some good starting points for similar projects.

1. The script-writing process was truly trans-disciplinary and collaborative
  - a. To develop a longer script, in a different style of theater would require more time (>1-2 years), and more opportunity for 'workshopping' with the research team, experts, local people, and piloting with audiences
2. The project was a manageable starting point for building a program designed with more broader-scale theatrical knowledge mobilization in partnership with other departments at the University
  - a. Given the scope, budget, and timeline, we were able to create a production that luckily fell into the hands of the right team, at the right time, and with the available resources to pull it off. The project coordinator served a vital role in keeping the team on-task and within budget.
  - b. Support staff buy-in is essential for growing the use of knowledge mobilization partnerships in the University
  - c. The benefits of the play outweighed the cost in term of tight turnaround; the most beneficial aspects were working with new and enthusiastic team, providing an experiential opportunity for the student actors, and the social learning
  - d. Knowledge mobilization theater helped to raise the profile of the Department of Drama as a collaborative, research-driven and experiential program
3. The marketing could be increased given that we know that this kind of production can be successful; we know now that we can facilitate this performance for larger audiences and in more venues
4. The collaboration could be expanded to include more opportunities for students and faculty by blending research knowledge mobilization into arts-based curriculums
  - a. This could present more opportunities to share research more widely, while not overburdening staff and faculty, and student performers
  - b. The collaboration could help with skills transfer from arts-based programs into the other departments on campus who don't necessarily focus on the life-skills learned by drama students
  - c. Scientists could also benefit from seeing their work presented in different ways for varied audiences – this would help them overcome issues with jargon, expression, and knowledge sharing. More and more granting agencies are requiring knowledge mobilization plans and partnering with arts-based programs could enhance their applications
5. There needs to be direct benefits for students for this type of collaboration to continue successfully
  - a. Exposure to novel scripts, set design and build, media training, logistics of touring shows, and communicating with researchers enhances the repertoire that students take away from their studies
6. Using forum theater helped deepen the conversation of stakeholders about water security issues in the SRB – this we heard from stakeholders themselves, but was also indicated by researchers who took part in the performances
7. Data collection, and knowledge mobilization can occur together; in fact, the meta-level data collection on the effectiveness of arts-based knowledge mobilization furthers current understanding of theories for knowledge mobilization
8. This seed project contributed to idea generation, innovations, and social learning that will continue with the research team



### **Opportunities for Future Performance-Engagement**

There are further opportunities to expand the science-via-arts-based knowledge mobilization program within and beyond the existing team that worked on this project. Below we indicate three possibilities that we are exploring:

1. Repeat performances of Downstream in more communities in the following years as we have had requests from educators, water managers, and researchers to use this performance in workshops, conferences, and in schools
2. Developing a larger-scale Partnership/Insight Grant with the Department of Drama, and the Global Institute for Water Security that extends the collaboration. This would involve undertaking a large grant application process that would build the program over 3-5 years and include more performances based on the research program of the socio-hydrology group in a national level drive for knowledge mobilization. This might include partnering with the School of Public Health, other Arts Departments (music, fine arts), and including Aboriginal programs for knowledge mobilization about current research in communities. The opportunity to create a new curriculum component for research knowledge mobilization in the form of arts-based productions could be packaged as a course with funding for its delivery.
3. Looking to other funding sources and programs for further opportunities. This may include agencies such as the Canadian Water Network, Canadian Institute of Health Research, Natural Science and Engineering Research Council, Canada Department of Foreign Affairs and International Trade: Arts and Cultural Industries and Performing Arts funds, Saskatchewan Arts Board, Canada Council for the Arts, and others.





## Conclusions

Downstream was an effort to transform the way we communicate research results with water stewards. It sought to convey research results about the different perspectives about water security in the Saskatchewan River Basin. It was collaboration between the Global Institute for Water Security, the School for Environment and Sustainability and the Department of Drama. More than traditional drama, Downstream engaged audiences in forum theatre - two-way communication, decision making, and post-performance focus groups. The results indicate that Downstream was a success – the performances received excellent reviews from across the river basin, audiences said that the forum theatre was a very effective way to convey different perspectives, and it was a pioneering way to engaged people in decision making research. Using forum theatre to convey research, engage audiences and capture research results is a significant achievement in that it provides a new tool for engaged scholarship. Many important lessons were learned in the development, production, and debriefing of Downstream. Going forward it would be wise to consider how this collaboration could be expanded to become an integral part of research communication at the University of Saskatchewan and beyond.



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## Appendix-1 Playbill

[illegible]