Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Okanagan Basin WATER BOARD



# Okanagan Invitational Drought Tournament SUMMARY REPORT

## Kelowna, BC

November 16th, 2012



Canada

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## EXECUTIVE SUMMARY

This report summarizes the Okanagan Invitational Drought Tournament (OIDT) which took place on November 16, 2012 in Kelowna, British Columbia. Fifty-three people from various disciplines attended the tournament. Teams developed a long term water management plan as they played through three rounds of the tournament drought scenario in Seco Creek, which was fictitious, but based on a real watershed and instrumental data in the Okanagan. Teams were given a budget each round to purchase a variety of management options to develop a plan, which was then presented to the other teams. Following all the teams' presentations, participant votes were cast to rate the plans on their ability to balance social, economic and environmental needs. A team of referees, composed of subject-matter experts, also voted on the plans. In addition to the votes, two models were used to aid in scoring and in interpreting management options undertaken. In the first, management choices were run in the Okanagan Hydrologic Connectivity Model (OHCM, based in the Water Evaluation and Planning System (WEAP) software package) to show how the chosen options would affect water usage and storage in the watershed. In the second, a Utility Model was created to demonstrate the expected level of satisfaction that watershed residents could garner from the chosen management options. Teams came up with a variety of innovative ideas for water management during the second and third rounds, including ideas about enhancing water use efficiency, exploring groundwater development and encouraging community gardens and other social developments, among others. Ultimately, the management plans developed will help support provincial policy development and facilitate drought planning in the Okanagan region. At the conclusion of the tournament, evaluation forms were handed out to all players. Feedback was very positive, with over 90 percent of respondents calling the tournament productive and a good learning experience. Some suggestions for future improvement include providing a more transparent scoring system, and better modelling. Looking forward, more drought tournaments are slated to take place in British Columbia, through 2013, as the IDT concept is further refined.

## INTRODUCTION

The Invitational Drought Tournament (IDT) is a simulation gaming concept under development at the Science and Technology Branch (STB) of Agriculture and Agri-Food Canada (AAFC) to support drought preparedness and response efforts. It facilitates the assessment of policies, programs and management strategies, and is applicable to a range of agriculture sector stakeholders, including provincial and local governments, watershed groups, industry, NGOs and academics. The IDT provides a forum for multi-disciplinary stakeholders to discuss drought preparedness and response in a workshop environment, as well as a safe setting for alternative management strategies to be explored.

In a Tournament teams are guided through a multi-year drought scenario in a fictitious watershed, and work together to develop drought management plans that reduce social, economic and environmental impacts in the watershed. Plans are scored by the referees and by individuals on other teams. Model output may also influence scores, depending on the context. The team with the best score wins!

Workshop participants identified the IDT as:

- an innovative tool to support planning under climate uncertainty that produces practical outcomes for drought management planning and informs policy development, both nationally and internationally; and
- an excellent opportunity for learning, knowledge exchange, and consensus-building.

Tournament workshops have been held in Alberta (2011) and Saskatchewan (2012). The United States also applied the Tournament framework in Colorado (2012). The most recent IDT was held in the Okanagan region of British Columbia. This report summarizes the Okanagan Invitational Drought Tournament (OIDT).

## OKANAGAN INVITATIONAL DROUGHT TOURNAMENT (OIDT) BACKGROUND

The Okanagan Invitational Drought Tournament (OIDT) was an event co-hosted by AAFC and the Okanagan Basin Water Board (OBWB) on November 16, 2012 at the Coast Capri Hotel in Kelowna, British Columbia. It was the result of a collaboration between AAFC, OBWB, the Province of British Columbia (Ministry of Agriculture and Lands – MAL; Ministry of Environment – MOE; and Ministry of Forests, Lands and Natural Resources – MFLNRO), the University of British Columbia Okanagan (UBCO), the Forum for Research

and Extension in the Natural Resources (FORREX) and the Canadian Water Resources Association (CWRA).

The objectives of the OIDT were:

1. to apply the IDT framework to a practical pilot case study in the Okanagan Basin to determine its ability to support drought preparedness, recovery and response in a real world policy context;
2. to facilitate multiple water actor and sector discussion around drought preparedness, response and recovery in the Okanagan Basin, with specific attention to in-stream/environmental flows, groundwater regulation and agricultural water reserves; and
3. to create a fun and engaging environment for water actors to explore management options under one realistic future drought scenario.

There were 53 people in attendance for this tournament – 30 participants, 4 referees, and 19 observers (see Appendix A for a list of all attendees). Participants and observers were invited from various disciplines and backgrounds to encourage diversity and varied viewpoints during the game. Participants were grouped into five different teams (Blue, Green, Orange, Red and Yellow). Referees had a range of scientific expertise. The observers consisted of members of the planning committee as well as the Technical Group processing teams' management plans.

Left: Photo of Orange Team member strategizing; Right: Discussion among referees.

## Process

Tournament attendees met the evening of November 15th for an informal reception on the tournament and for networking. The tournament began in the morning of November 16th, and ran from 8:00 a.m. to 4:30 p.m., with a lunch and health breaks throughout the day. The teams were given a brief introduction to gameplay, including their budget, and were then allowed to discuss their team's long term water management plan and purchase long term management options from the list provided to them. The game continued, with teams being presented scenarios through three rounds of gameplay (see Appendix B for agenda). These drought scenarios were for the fictitious Seco Creek Watershed, which was based on a real

Okanagan watershed, and include information from the instrumental record on stream flow, snowpack, precipitation, and temperature. After the first portion of the scenario (April) was presented for the round, participants developed a management plan and chose options depending on their allocated budget for that year (Table 1; see Appendix C for management options). In rounds 2 and 3, teams were able to implement innovative strategies not included in the list provided to them. These innovative ideas were required to be feasible, with realistic estimated costs (to be subtracted from teams' budgets), and to be approved by the Referees. Teams were then provided with information from November of the same year. This included climate information, and model output from the OHCM-WEAP which provided stream flow, reservoir levels, unmet demands and unmet environmental flows. This information was provided to gauge how each of their management options fared. In addition, teams were given information on the utility function of their plans, a model of how positively Seco Creek citizens would respond to the management plan.[1] Teams presented their plans to each other, and were scored using a paper-based ballot system. When presenting their management plan, teams were asked to include their overall management approach, followed by their chosen management options, keeping in mind the three pillars of sustainability – environmental, economic, and social.

**Table 1. Budgets for Okanagan Invitational Drought Tournament**

| **Round** | **Budget** |
|---|---|
| Long term (LT) | $12,000,000 |
| 1 | $25,000,000 + Carryover from Long-Term Round |
| 2 | $10,000,000 + Carryover from Round 1 |
| 3 | Carryover from Round 2 |

[1] For clarification: utility functions were given before scoring in year one, after scoring in rounds two and three to gauge participants' response to how the model could be used in the context of the game.

Left: Technical Group processing team selections; Right: Yellow Team members analyzing the output.

## Scoring and Voting

After teams presented their management plans to each other, they scored the other teams individually in three different categories: society, economy and environment, on a scale from 7 to 1, with a score of 7 representing a very effective reduction of drought impacts, and 1 a very ineffective reduction. Referees also scored each team and together this accounted for 75% of the overall round score for each team. The final 25% of the round score was arrived at by taking into account the utility scores for each team (Figure 1).

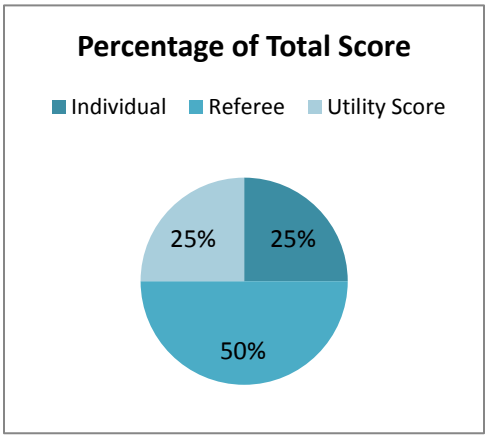


**Figure 1. OIDT Team Score**

The scoring data were collected by the University of Saskatchewan for analysis of voting patterns and drivers influencing decision making in the game. A report will be available summarizing these findings.

## Modelling

This section was summarized from Brydon, 2012[2]

[2] Brydon, M. 2012. "Comments on the 2012 Okanagan Invitational Drought Tournament" 12p.

### *The Okanagan Hydrologic Connectivity Model (based in the WEAP System)*

The WEAP-based OHCM is a 'supply and demand' water balance model developed by the OBWB and other governmental partners. This model takes a hydrological model of the basin (Mike SHE data) and uses the water balance model to provide predictions of unmet demand for difference classes of stakeholders (residential, commercial, etc.) given initial conditions and seasonal inputs. This model can predict the effects of administrative decisions (water restrictions, reservoir expansion) but does not work in real-time. It is also important to note that model output is based on fully specified inputs, and real-world scenarios are highly variable and management options may work differently under different conditions.

### *Utility Model*

A utility function was developed to compliment the OHCM. Utility is a measure of the amount of satisfaction society associates with an outcome. It provides a common unit of measure to describe social welfare, especially when outcomes are measured differently to difference economic classes. In this model, a higher utility number is applied to a better outcome.

The utility model outcome was given to teams before they were scored (round one) and then after they were scored (rounds two and three). This was changed because teams' scoring was found to have been influenced by the model outputs. These outputs enabled players to see the utility of their overall management plan as it was developed.

## SUMMARY OF KEY FINDINGS

The OIDT was successful in stimulating discussions around water management under climate uncertainty, and provided an excellent testing opportunity for AAFC's IDT project. Teams worked together to develop comprehensive drought management plans, as well as an array of innovative ideas for water management during the second and third rounds – these included ideas about taxation, resource use, future planning, or social planning. Participants also had fun and learned from one another.

### Management Plans

In the Long Term round two teams increased storage capacity (Red and Yellow), while four of the five teams implemented a drought education program (except Red) and irrigation water use efficiency by 10 or 20% (except Yellow). None of the teams chose to regulate groundwater (see Table 2).

Teams were given a large budget in Round 1 ($25,000,000 + Carryover from Long-Term Round) and water shortages were becoming a reality. In this round all teams implemented

a xeriscaping bylaw (see Table 3). Four of five teams recycled 60% of domestic indoor water (except Blue), provided a payout to agricultural producers (except Orange), developed a local drought strategy (except Blue), implemented collaborative meetings (except Red), and invested in a drought education program (except Orange). Two teams chose to improve health services (Blue and Green) and one developed a basin drought strategy (Blue). In-stream flows were deemed highest priority after domestic indoor by teams Blue and Red; however, Orange selected agriculture demands as highest priority. At the same time, Blue restricted commercial and industrial water use, and Orange and Yellow restricted residential water use.

Round 2 brought severe water shortages to the Seco Creek Watershed, challenging teams to find alternative solutions (Tables 4 and 6), especially given the relatively small budget they were allocated ($10,000,000 + Carryover from Round 1). Collaborative meetings were implemented by all teams to coordinate drought communications in this round. Producer payouts, restricted lawn watering and implementation of drought education programs were also popular choices among the teams, with four teams selecting each. Teams also recycled domestic indoor water, restricted the filling of outdoor pools and developed a local drought plan. Yellow restricted residential water use and prioritized in-stream flows. No teams chose to prioritize agriculture water demands or to restrict commercial water use. Innovative strategies developed by teams included ecological services land tax, restructuring of water rates, increasing upper water block price, recycling greywater , pumping lake or groundwater, developing spawning channels and replanting subsidy (see Table 6).

With budgets cut back (just Carryover from Round 2) and water supplies beginning to recover in Round 3, three teams restricted lawn watering (Green, Red and Yellow), implemented collaborative meetings (Blue, Green and Red) and invested in drought education (Blue, Green and Red). Two teams compensated agriculture producers (Green and Red) and team Orange recycled domestic indoor water. See Table 5 for details. In addition to reselecting innovations from Round 2, innovations in Round 3 ranged from residential conservation and demand reduction bylaws, to decentralized storage and infiltration galleries, to logging for increase inflow and changeovers to drip irrigation. Many different types of future planning strategies were implemented this round, including water reserves for conservation and licencing, audits of water use and implementation, storage and ground water studies, and emergency funds for intake, community wells and potable water tanks (see Table 6).

The range of team selections each round highlights the complexities around preparedness and adaptation under climate uncertainty and the trade-offs associated with decision

making. The teams each appeared to take a different approach in the game, possibly due to its members and their expertise, leading to differences in their management plans.

## Participant Feedback

Twenty-six evaluation forms (Appendix C) were received. The following summary indicates the amount of respondents that either agreed or strongly agreed with questions 1-7.

1. Overall the tournament was a productive use of my time (96%)
2. The scenarios presented in the workbook were concise and easy to follow along with (96%)
3. The maps presented in the workbook were visually pleasing, clear and useful (59%)
4. I learned a lot about water management issues from the tournament (77%)
5. My team had enough time to complete all the required tasks (62%)
6. The tournament was a good learning experience (96%)
7. The tournament enabled team building and interaction between different sectors (96%)

### *What participants liked*

- Participants appreciated the level of stakeholder engagement and participatory nature of the game.
- They found the integrated approach to solving complex problems under uncertainty and assessment of trade-offs valuable.
- People also liked the opportunity to think freely, propose their own innovations in rounds 2 and 3, and network with others.

### *What participants disliked*

- The inability to show cumulative effects of management options was one issue raised by a number of participants, since teams had to invest in the same strategies round after round – their selections in round 1 did not carry forward into round 2, for example.
- They also mentioned the lack of feedback on their innovations and information about community priorities.
- A lack of transparency in the scoring and the utility model output were also identified by a few people.

### *Suggestions for improvements*

- A greater inclusion of issues that pertain to all water actors in the real world would provide for a more realistic and holistic scenario within the fictitious basin.

- Other items that could be included in the tournament are: a more well-defined political environment, direct feedback from the citizens of the watershed, and information on water quality and groundwater.

## Table 2: Long Term Options

| Code | Name | Cost | Chosen |
|---|---|---|---|
| **LT-I1** | **Infrastructure/Reservoir:** Increase Seco Creek system storage capacity by 3,000,000 $m^3$ (total: 14,000,000 $m^3$) | $10,500,000 | R, Y |
| **LT-B2** | **New Bylaw:** Enhance agriculture irrigation water use efficiency by 10% | $300,000 | -- |
| **LT-B3** | **New Bylaw:** Enhance agriculture irrigation water use efficiency by 20% | $600,000 | B, 0 |
| **LT-B4** | **New Bylaw:** Enhance agriculture irrigation water use efficiency by 30% | $900,000 | G, R |
| **LT-W1** | **Regulate water use:** Implement Groundwater Regulation (WAM) process | $5,000,000 | -- |
| **LT-P1** | **Program/Activity:** Drought Education Program (signage, workshops, etc.) | $1,000,000 | B, G, O, Y |
| **LT-P2** | **Program/Activity:** Develop local drought strategy / plan | $4,000,000 | B |
| **LT-P3** | **Program/Activity:** Develop Basin drought strategy / plan | $8,000,000 | G, O |

## Table 3: In-Game Management Options – Round 1

| Code | Name | Cost | Blue | Green | Orange | Red | Yellow |
|---|---|---|---|---|---|---|---|
| **B1** | **New Regulation:** Recycle/reuse 60% of domestic indoor water | $5,000,000 | | x | x | x | x |
| **B2** | **New Bylaw:** No lawn watering | $1,000,000 | x | x | | x | |
| **B3** | **New Bylaw:** No filling of outdoor pools | $1,000,000 | | x | | | |
| **B4** | **New Bylaw:** Xeriscaping (half the homes in Charlestown) | $2,000,000 | x | x | x | x | x |
| **B5** | **New Bylaw:** Commercial & Industrial water use restrictions by 10% | $1,000,000 | x | | | | |
| **B6** | **New Bylaw:** Residential water use restrictions (alternate days) – reduce domestic outdoor water demand by 20% | $3,000,000 | | | x | | x |
| **W1** | **Regulate water use:** In-stream/environmental flow demands highest priority, after domestic indoor | $3,000,000 | x | | | x | |
| **W2** | **Regulate water use:** Agriculture water demands highest priority, after domestic indoor | $3,000,000 | | | x | | |
| **P1** | **New L/G tax policy:** Agricultural producer payout for not irrigating | $2,000,000 | x | x | | x | x |
| **P2** | **Program/Activity:** Improvement to health services (mental & physical) | $2,000,000 | x | x | | | |
| **P3** | **Program/Activity:** Implement collaborative meetings with all levels of government and local partners to coordinate drought communication | $500,000 | x | x | x | | x |
| **P4** | **Program/Activity:** Drought Education Program (signage, workshops, etc.) | $1,000,000 | x | x | | x | x |
| **P5** | **Program/Activity:** Develop local drought strategy / plan | $4,000,000 | | x | x | x | x |
| **P6** | **Program/Activity:** Develop Basin drought strategy / plan | $8,000,000 | x | | | | |

## Table 4: In-Game Management Options – Round 2

| Code | Name | Cost | Blue | Green | Orange | Red | Yellow |
|---|---|---|---|---|---|---|---|
| **B1** | **New Regulation:** Recycle/reuse 60% of domestic indoor water | $5,000,000 | | x | x | | |
| **B2** | **New Bylaw:** No lawn watering | $1,000,000 | x | x | x | x | |
| **B3** | **New Bylaw:** No filling of outdoor pools | $1,000,000 | | x | x | | |
| **B4** | **New Bylaw:** Xeriscaping (half the homes in Charlestown) | $2,000,000 | x | x | | | x |
| **B5** | **New Bylaw:** Commercial & Industrial water use restrictions by 10% | $1,000,000 | | | | | |
| **B6** | **New Bylaw:** Residential water use restrictions (alternate days) – reduce domestic outdoor water demand by 20% | $3,000,000 | | | | | x |
| **W1** | **Regulate water use:** In-stream/environmental flow demands highest priority, after domestic indoor | $3,000,000 | | | | | x |
| **W2** | **Regulate water use:** Agriculture water demands highest priority, after domestic indoor | $3,000,000 | | | | | |
| **P1** | **New L/G tax policy:** Agricultural producer payout for not irrigating | $2,000,000 | x | x | x | x | |
| **P2** | **Program/Activity:** Improvement to health services (mental & physical) | $2,000,000 | | x | | | |
| **P3** | **Program/Activity:** Implement collaborative meetings with all levels of government and local partners to coordinate drought communication | $500,000 | x | x | x | x | x |
| **P4** | **Program/Activity:** Drought Education Program (signage, workshops, etc.) | $1,000,000 | x | x | | x | x |
| **P5** | **Program/Activity:** Develop local drought strategy / plan | $4,000,000 | | | x | | x |
| **P6** | **Program/Activity:** Develop Basin drought strategy / plan | $8,000,000 | | | | | |

## Table 5: In-Game Management Options – Round 3

| Code | Name | Cost | Blue | Green | Orange | Red | Yellow |
|---|---|---|---|---|---|---|---|
| **B1** | **New Regulation:** Recycle/reuse 60% of domestic indoor water | $5,000,000 | | | x | | |
| **B2** | **New Bylaw:** No lawn watering | $1,000,000 | | x | | x | x |
| **B3** | **New Bylaw:** No filling of outdoor pools | $1,000,000 | | x | | | |
| **B4** | **New Bylaw:** Xeriscaping (half the homes in Charlestown) | $2,000,000 | | | | | |
| **B5** | **New Bylaw:** Commercial & Industrial water use restrictions by 10% | $1,000,000 | | | | | |
| **B6** | **New Bylaw:** Residential water use restrictions (alternate days) – reduce domestic outdoor water demand by 20% | $3,000,000 | | | | | |
| **W1** | **Regulate water use:** In-stream/environmental flow demands highest priority, after domestic indoor | $3,000,000 | | | | | |
| **W2** | **Regulate water use:** Agriculture water demands highest priority, after domestic indoor | $3,000,000 | | | | | |
| **P1** | **New L/G tax policy:** Agricultural producer payout for not irrigating | $2,000,000 | | x | | x | |
| **P2** | **Program/Activity:** Improvement to health services (mental & physical) | $2,000,000 | | | | | |
| **P3** | **Program/Activity:** Implement collaborative meetings with all levels of government and local partners to coordinate drought communication | $500,000 | x | x | | x | |
| **P4** | **Program/Activity:** Drought Education Program (signage, workshops, etc.) | $1,000,000 | x | x | | x | |
| **P5** | **Program/Activity:** Develop local drought strategy / plan | $4,000,000 | | x | | | |
| **P6** | **Program/Activity:** Develop Basin drought strategy / plan | $8,000,000 | | | | | |

**Table 5: Innovations for Round 2 and 3**

| | Round | Team |
|---|---|---|
| **Taxation/Bylaws/Pricing** | | |
| ▪ Land tax for ecological services (revenue neutral) | 2 | B |
| ▪ Proportional demand reduction bylaw | 3 | B |
| ▪ Increase upper water block price 10% (assume metering is in use) | 2, 3 | G |
| ▪ Restructure water rate | 2 | O |
| ▪ Raise taxes | 3 | G |
| ▪ Residential water conservation | | |
| ▪ Bylaw enforcements | 3 | O |
| **Resource Use** | | |
| ▪ Pump groundwater / increase use / maintain | 2 | B,O |
| ▪ Decentralized storage | 3 | B |
| ▪ Infiltration gallery (funded by ecological land tax) | 3 | B |
| ▪ Replant subsidy – remove trees and pay farmers to delay replanting | 2 | G |
| ▪ Pump lake (50% of Charlestown water use on a temporary license with cost amortization) | 2, 3 | G |
| ▪ Buy additional greywater recycling (75%) | 2, 3 | G,R |
| ▪ Log 5% of watershed strategically above the reservoir to increase inflow | 3 | G |
| ▪ Changeover agriculture irrigation to drip irrigation | 3 | O |
| ▪ Spawning channels – reduce fish flows by 50% but maintain fisheries production | 2 ,3 | R |
| ▪ Enhance agricultural irrigation water use efficiency | 2 | Y |
| **Future Planning** | | |
| ▪ Develop feasibility study on more storage opportunities | 2 | B |
| ▪ Develop a water reserve for conservation and licensing | 3 | O |
| ▪ Audit of water use and implementation | 3 | O |
| ▪ Storage and supply groundwater feasibility study | 3 | R |
| ▪ Emergency fund – lake intake, community well, tank of potable water | 3 | R |
| ▪ Pilot project for groundwater potential | 3 | Y |
| **Social Innovations** | | |
| ▪ Implement a community garden | 2 | O |

## CONCLUSIONS

The Okanagan Invitational Drought Tournament was a great success. Participants had important feedback that will be incorporated into later versions of the IDT, and found the tournament to be a valuable learning exercise. The management plans developed by the teams each round – including innovations – will help inform British Columbia policy

development and potentially inform drought management planning in the Okanagan. The OIDT stimulated interest in holding subsequent tournaments in the province because it provides a great opportunity for learning, knowledge exchange and consensus-building among stakeholders on issues of common interest, and stimulates development of practical outcomes to address the issues. Congratulations to the Red team, who won the tournament!

## ACKNOWLEDGMENTS

Thank you to all those who helped ensure the Okanagan Invitational Drought Tournament was a success!

## Appendix A: Final Participant List

Final OIDT Attendance List

| Team | Name | Affiliation |
|---|---|---|
| Red | Jason Schleppe | Ecoscape Environmental Consultants Ltd. |
| Red | Lorraine Bennest | Okanagan Tree Fruit Authority |
| Red | Eva Antonijevic | Native Plant Society of British Columbia |
| Red | Graeme Hayward | Urban Systems Ltd. |
| Red | Anna Warwick Sears | Okanagan Basin Water Board |
| Red | Denise Neilsen | Agriculture and Agri-Food Canada |
| | | |
| Blue | Conrad Pryce | Government of British Columbia |
| Blue | Jennifer Miles | Regional District of North Okanagan |
| Blue | Lee Hesketh | Silver Hills Ranch |
| Blue | Keith Duhaime | University of British Columbia |
| Blue | Glen Zachary | Urban Systems |
| Blue | Stewart Cohen | Environment Canada |
| Blue | Bob Sandford | R.W. Sandford |
| | | |
| Yellow | Judie Ekkert | Interior Health Authority |
| Yellow | Chris Radford | Regional District of Central Okanagan |
| Yellow | Michelle Cook | Urban Systems |
| Yellow | Jennifer Turner | Government of British Columbia |
| Yellow | Bernie Bauer | University of British Columbia |
| | | |
| Orange | Carol Zanon | District of West Kelowna |
| Orange | Shona Becker | |
| Orange | Graham Watts | Cordilleran Ecological |
| Orange | Candace Wagner | Regional District of Okanagan-Similkameen |
| Orange | Margaret Bakelaar | Regional District of Central Okanagan |
| Orange | Doug Edwards | Agriculture and Agri-Food Canada |
| | | |
| Green | Denise MacDonald | |
| Green | Scott Smith | Agriculture and Agri-Food Canada |
| Green | Stu Wells | Mayor - Town of Osoyoos |
| Green | John Janmaat | University of British Columbia |
| Green | Jeff Curtis | University of British Columbia |
| Green | David Hendrickson | Real Estate Foundation of British Columbia |
| | | |
| Referee | Ted van der Gulik | BC Ministry of Agriculture and Lands |
| Referee | Ron Woodvine | Agriculture and Agri-Food Canada |

| | | |
|---|---|---|
| Referee | Brian Symonds | Government of British Columbia |
| Referee | Valerie Cameron | Government of British Columbia |
| | | |
| Observer | Corinne Jackson | Okanagan Basin Water Board |
| Observer | Dan Austin | Summit Environmental Consultants Inc. |
| Observer | Drew Lejbak | Summit Environmental Consultants Inc. |
| Observer | Evan Davies | University of Alberta |
| Observer | Graham Strickert | University of Saskatchewan |
| Observer | James Littley | Okanagan Basin Water Board |
| Observer | Kai Wang | University of Alberta |
| Observer | Michael Brydon | Simon Fraser University |
| Observer | Mandy Wheelwright | |
| Observer | Harvey Hill | Agriculture and Agri-Food Canada |
| Observer | Monica Hadarits | Agriculture and Agri-Food Canada |
| Observer | Nelson Jatel | Okanagan Basin Water Board |
| Observer | Richard Rieger | Agriculture and Agri-Food Canada |
| Observer | Suzan Lapp | FORREX |
| Observer | Warren Wilson | Intersol |
| Observer | Celine Davis | Government of British Columbia |
| Observer | Ted White | Government of British Columbia |
| Observer | Jessa Arcuri | |
| Observer | Bob Fleming | |

| | | |
|---|---|---|
| Total | Participants | 30 |
| | Referees | 4 |
| | Observers | 19 |
| | | |
| | TOTAL | 53 |

## Appendix B: Agenda

**OKANAGAN INVITATIONAL DROUGHT TOURNAMENT**
**November 16, 2012 – Kelowna**

**PARTICIPANT AGENDA – Final (October 30)**

**Objectives:**

4. To apply the Invitational Drought Tournament (IDT) framework to a practical pilot case study in the Okanagan Basin to determine the IDT framework's ability to support drought preparedness, recovery and response in a real policy context;
5. To facilitate multiple water actor and sector discussion around drought preparedness, response and recovery in the Okanagan Basin, with specific attention to in-stream/environmental flows, groundwater regulation and agricultural water reserves; and
6. To create a fun environment for water actors to explore management options under one realistic future drought scenario.

**ROAD MAP**

**Evening Day 1 - November 15, 2012**

**19:00** ❑ **Reception**
- Informal presentation on tournament, networking

**Day 2 - November 16, 2012**

08:00 ❑ Coffee/tea, arrival, registration

**08:30** ❑ **Welcome** ***Organizer(s)***
- Review of purpose, process

❑ Process & Agenda Review ***Facilitator***
- How we will work together, introductions, "rules" of the game
- Review of scoring process

**09:00** ❑ **Preparing for the Scenario (Plenary)** ***Organizer(s)***
- Frame the challenge

❑ Team Discussion & Decision (Table discussion - Break-outs)
- Discussion on overall strategy/approach as follows:
  1. What is the team's long term water management plan?
- Submit decisions

**09:30** ❑ **Round 1 (Plenary)** ***Organizer(s)***
- Present scenario with April data

❑ Team Discussion & Decision (Table discussion - Break-outs)
- Development of Management Plan for Round 1
- In the context of long term Management Plan

**10:15** ❑ **Health Break**

10:30 ❑ Present New Information — ***Organizer(s)***
- Provide November conditions/data

❑ Team Discussion
- Implications of management plan – given November conditions

11:00 ❑ Debrief – Round 1 (Plenary) — ***Facilitator***
- Team Presentations (5 minutes each – total of 30 mins)
- Individual and referee scoring

**11:30** ❑ **Round 2 (Plenary)** — ***Organizer(s)***
- Present scenario with April data

❑ Team Discussion & Decision (Table discussion - Break-outs)
- Development of Management Plan for Round 2

**12:00** ❑ **Lunch**
- Key Note Speaker

13:00 ❑ Present New Information — ***Organizer(s)***
- Provide November conditions/data

❑ Team Discussion
- Implications of management plan – given November conditions

13:30 ❑ Debrief – Round 2 (Plenary) — ***Facilitator***
- Team Presentations (5 minutes each – total of 30 mins)
- Individual scoring

**14:00** ❑ **Round 3 (Plenary)** — ***Organizer(s)***
- Present scenario with April data

❑ Team Discussion & Decision (Table discussion - Break-outs)
- Development of Management Plan for Round 3

14:30 ❑ Present New Information — ***Organizer(s)***
- Provide November conditions/data

❑ Team Discussion
- Implications of management plan – given November conditions

14:45 ❑ Debrief – Round 3 (Plenary) — ***Facilitator***
- Team Presentations (5 minutes each – total of 30 mins)
- Individual scoring

**15:15** ❑ **Health Break**

**15:30** ❑ **Final Debrief (Table and Plenary) – Key Lessons Learned** — ***Facilitator***

16:15 ❑ Closing Comments & Next Steps — ***Organizer(s)***
- Announce winner, prizes

**16:30** ❑ **Adjourn**

**Participant Roles:**

| Observers or "Fans" | Referees |
|---|---|
| • Observing the process for potential future IDT application and for feedback - IDT process etc.<br>• Participate in scoring | • Evaluate the cost and benefits of innovative adaptation options<br>• Engage in the scoring process along with the individual players and teams |

| Players | Facilitator |
|---|---|
| • Actively participate in the Okanagan Invitational Drought Tournament<br>• Consist of team players from within the Okanagan Basin (provincial government representatives and Okanagan water actors)<br>• From the team – time keepers, budget keepers and recorders are selected for each round | • Facilitate the process overall<br>• Work with organizers to adjust as necessary<br>• Develop report with observations focused on the "process" – the conduct of the activity |

## Appendix C: List of Management Options

| Code | Management Strategy | Description | Cost | **Purchased** (Mark with an 'X') |
|---|---|---|---|---|
| Hydrology | | | | |
| LT-I1 | **Infrastructure/Reservoir:** Increase Seco Creek system storage capacity by 3,000,000 $m^3$ (total: 14,000,000 $m^3$) | Increased storage is available for use later (e.g. irrigation) | $10,500,000 | |
| LT-B2 | **New Bylaw:** Enhance agriculture irrigation water use efficiency by 10% | Water use efficiency is increased for all irrigators | $300,000 | |
| LT-B3 | **New Bylaw:** Enhance agriculture irrigation water use efficiency by 20% | Water use efficiency is increased for all irrigators | $600,000 | |
| LT-B4 | **New Bylaw:** Enhance agriculture irrigation water use efficiency by 30% | Water use efficiency is increased for all irrigators | $900,000 | |
| Other | | | | |
| LT-W1 | **Regulate water use:** Implement Groundwater Regulation (WAM) process | Regulating groundwater would allow for this resource to be used effectively. | $5,000,000 | |
| LT-P1 | **Program/Activity:** Drought Education Program (signage, workshops, etc.) | A series of information seminars, workshops, and communication to the public to raise drought awareness | $1,000,000 | |
| LT-P2 | **Program/Activity:** Develop local drought strategy / plan | Working with local stakeholders, develop a community strategy that sets out guidelines for tracking and responding to drought | $4,000,000 | |
| LT-P3 | **Program/Activity:** Develop Basin drought strategy / plan | Working with local stakeholders from across the basin, develop a strategy that sets out guidelines for tracking and responding to drought across the region. | $8,000,000 | |

| Code | Management Strategy | Description | Cost |
|---|---|---|---|
| B1 | **New Regulation:** Recycle/reuse 60% of domestic indoor water | This regulation would require installation of grey water technology to direct this water for other uses such as golf course watering | $5,000,000 |
| B2 | **New Bylaw:** No lawn watering | Public outreach campaign to notify municipal users to stop watering lawns, and enforcement of bylaw | $1,000,000 |
| B3 | **New Bylaw:** No filling of outdoor pools | Public outreach campaign to notify municipal users to stop filling outdoor pools, and enforcement of bylaw | $1,000,000 |
| B4 | **New Bylaw:** Xeriscaping (half the homes in Charlestown) | Conversion of front yard lawns to maintenance free rock or other (xeriscaping) through grants to homes | $2,000,000 |
| B5 | **New Bylaw:** Commercial & Industrial water use restrictions by 10% | C & I water usage would be throttled by the water provider to ensure a 10% decrease | $1,000,000 |
| B6 | **New Bylaw:** Residential water use restrictions (alternate days) – reduce domestic outdoor water demand by 20% | Public notification campaign accompanying to restrict outdoor uses like lawn watering to alternate days of the week; the net benefit is a reduction in demand | $3,000,000 |
| W1 | **Regulate water use:** In-stream/environmental flow demands highest priority, after domestic indoor | Water demand is maintained for necessary human health usage (e.g. drinking water), followed by environmental in-stream flow needs | $3,000,000 |
| W2 | **Regulate water use:** Agriculture water demands highest priority, after domestic indoor | Water demand is maintained for necessary human health usage (e.g. drinking water), followed by irrigation needs | $3,000,000 |
| P1 | **New L/G tax policy:** Agricultural producer payout for not irrigating | A program that would compensate for those producers not irrigating during the drought | $2,000,000 |
| P2 | **Program/Activity:** Improvement to health services (mental & physical) | This program would provide services for those dealing with the harmful effects of the drought | $2,000,000 |

| | | | |
|---|---|---|---|
| | | (e.g. farm stress line) | |
| P3 | **Program/Activity:** Implement collaborative meetings with all levels of government and local partners to coordinate drought communication | Develop a coordinated response on the drought and communication outreach to the public to inform about what is being done in the basin | $500,000 |
| P4 | **Program/Activity:** Drought Education Program (signage, workshops, etc.) | Develop a series of workshops and promotions to raise awareness of the drought and what citizens can do | $1,000,000 |
| P5 | **Program/Activity:** Develop local drought strategy / plan | Working with local stakeholders, develop a community strategy that sets out guidelines for tracking and responding to drought | $4,000,000 |
| P6 | **Program/Activity:** Develop Basin drought strategy / plan | Working with local stakeholders from across the basin, develop a strategy that sets out guidelines for tracking and responding to drought across the region. | $8,000,000 |