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# Challenges and potential adaptation strategies of rural water co-ops: an Alberta case study

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## Challenges and Potential Adaptation Strategies of Rural Water Co-ops: An Alberta Case Study

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# **Challenges and Potential Adaption Strategies of Rural Water Co-ops: An Alberta Case Study**

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## **Abstract**

With roots going back decades, rural co-operative water systems play an important role in rural water management on the Prairies. But some of these co-operatives, especially those adjacent to large and growing urban centres, are facing significant challenges. This study focuses on water co-operatives within Rocky View County, a rural municipality adjacent to the city of Calgary. The County is experiencing significant water demand pressures from regional population growth. However, under Alberta's water licensing allocation system, increased demand in the Bow River Basin—where the County is situated—cannot be met by acquiring additional water licenses. This study presents a preliminary exploration into the views of three groups: water managers—co-operatives as well as private systems, housing developers, and Rocky View County councillors. The views gathered relate to the extent of the water challenges, the current and future ability to manage them, potential consequences, and possible solutions. Key findings are water managers' expressed lack of confidence in adapting to water challenges and a lack of common understanding amongst the three groups as to the seriousness and consequence of those challenges. In meeting the challenges, a solution which presents the greatest support is the development of a regional umbrella water management organization.

**Keywords:** water, co-operatives, rural, water management, Alberta

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## **1.0 Introduction**

Co-operatives have played an essential role in the development of the Prairies with roots extending back to the turn of the century when they were established to counteract various forms of market failure (Fulton & Ketilson, 1992). The defining characteristic of co-operatives is that they are democratic organizations, owned and controlled by their members and users and they apply co-operative principles and values in their daily functions (Novkovic, 2008).

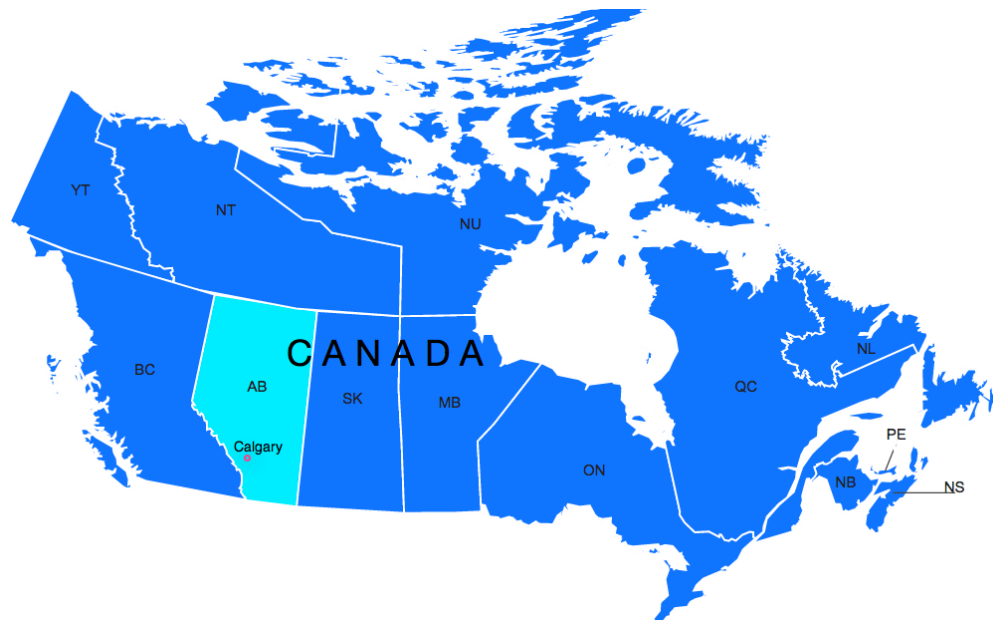
In Alberta, co-operatives pre-date the establishment of the province. Some, such as the United Farmers of Alberta (UFA), are still very active and other, new co-operatives are emerging in sectors such as health care and financial services (Aupers, 2007). In Alberta there are approximately 800 non-financial co-ops and an additional

61 individual credit unions (Aupers, 2007). Co-operatives' role in rural Alberta is significant when one considers, for example, that the Federation of Alberta Gas Co-ops Limited has created the largest rural gas system in the world (Aupers, 2007). Furthermore, the UFA co-operative organization has expanded from its modest beginnings in 1909 to become an extensive agriculture, petroleum and construction retail operation, with 120,000 active owners today (United Farmers of Alberta, 2014). Ruralwater co-operatives came together to form water distribution systems to supply water to scattered country homes and their livestock. Currently there are about 170 water co-operatives in the province (Alberta Federation of Rural Water Co-operatives, 2014).

Much has been written about the role and influence of Prairie co-operatives. Studies have focussed on, for example: co-operative history (Chapman, 2012; Fairbairn, 2006; Melnyk, 2009), governance (de Clercy, 2006; Fulton, 1997; Hoyt, 2003), economic impact (Herman & Fulton, 2001; Ketilson, Gertler, Fulton, Dobson, & Polsom, 1998), and marketing (Brown, 2006; Heit & Gertler, 2009). Other studies have concentrated on specific sectors including agriculture (Fulton & Gibbings, 2000), health care (Leviton-Reid, 2009) and finance (Fairbairn, Ketilson, & Krebs, 1997). Some studies have examined the reasons for the demise of grain handling co-operatives such as the Saskatchewan Wheat Pool when facing new circumstances and challenges (Fulton & Larson, 2009). But despite the role of water co-operatives in delivering water to rural areas for decades, few studies have paid attention to them. This paper focuses on contemporary water co-operatives and private systems operating within Rocky View County which is located adjacent to the city of Calgary Alberta, Canada.

The city of Calgary is situated in the western province of Alberta Canada, as depicted in Figure 1.

*Figure 1:* Calgary within Alberta, Canada.



Source: [www.keywork-suggestions.com](http://www.keywork-suggestions.com)

Rocky View County is located to the west, north and east of the city of Calgary, essentially forming a horseshoe around the city as depicted in Figure 2 below.

Figure 2: Rocky View County.



Source: <http://www.sellingscalgary.biz/wp-content/uploads/2013/10/Rural-Rocky-View-County-Map.jpg>

Given its proximity to the rapidly growing city of Calgary, the County has been absorbing urbanized families who, while working in Calgary, have been seeking the rural life style offered by the County. The resultant population growth occurring in the County is juxtaposed alongside water supply constraints attributable to the 2006 closure of the Bow River Basin to new water license allocations. We conducted a preliminary investigation into the views of three groups which are central to water management: water co-operative and private system managers, housing developers, and the County’s elected municipal councillors. We explored their views as to the extent of their perceptions of the County’s water challenges, the current and future ability to manage these challenges, potential consequences of these challenges as well as the extent of support for possible measures that could be taken to meet those challenges.

We begin this paper by providing the study’s context including the characteristics of Rocky View County within the Calgary region and the water management challenges that lie therein. The next section lays out the study design followed by the study results. The final section sums up the results and provides conclusions and recommendations.

## 2.0 Study Context

Rocky View County has been experiencing significant population growth. From 1991 to 2011 its population increased by 93 percent (Spruit, 2013). The County is described as “a formerly rural area that is now an urban-rural nexus impacted by external pressures from its urban neighbours” (Gondek, 2014, p. 6). A rural growth discussion paper commissioned by the County speaks of “grappling with a challenge common to all rural communities located on the edge of an urban centre—growth

pressure” (Rocky View County, 2012, p.4). The discussion paper states that demand for residential growth in a rural setting is projected to “trend upward” (Rocky View County, 2012, p.4). A separate engineering study also found that Rocky View County does not have enough water license allocation for large-scale growth and will experience water shortages as early as 2030 (CH2M Hill, 2007).

Rocky View County’s water is provided through a large number of water co-operatives and private systems. In total, there are 68 such entities (CH2M Hill, 2007). Under Alberta’s water management framework, access to water supply is managed through a water licensing system, specifying access to a quantity of water on a yearly basis. Across the 68 entities in Rocky View County there are approximately 50 water licenses, some dating back to the early 1970’s. Both surface water and groundwater are relied on as water sources. About 60 percent of the licenses are for surface water and 40 percent for ground water (CH2M Hill, 2007).

Amongst the large number of water systems, co-operatives figure predominantly. Co-operatives were the earliest formations for the delivery of water in rural Alberta, dating back to the 1960’s and 1970’s (Alberta Agriculture and Rural Development, 2013). In Rocky View County, the Rocky View Water Co-op is by far the largest water license holder, accounting for 40 percent of total licensed water volume in the County. There are 33 other water co-operatives which operate in the County which, in addition to the Rocky View Water Co-op, account for 50 percent of total licensed water volume. The balance of water is provided by private water systems which arrived later to service primarily small estates, schools and golf courses (CH2M Hill, 2007).

Rapid population and economic growth, combined with increased concern for the environment, prompted the Alberta Government to take the unprecedented step in 2006 of closing the three sub-basins of the South Saskatchewan River Basin to new licensed water allocations. This measure applies to most of the southern Alberta region given that the moratorium on new licenses includes the Bow River Basin, South Saskatchewan sub-basin and Oldman River Basin.

Rocky View County is largely situated in the Bow River Basin except for the northern most portion of the County which is situated in the Red Deer River Basin. The Bow River Basin is large and complex, spanning 645 kilometers from the Rocky Mountains across the prairies within which there are 15 sub-basins. The basin is home to 34 percent of Alberta’s population, or approximately 1.2 million people, making it the most highly populated river basin in the province. It is also one of the most highly managed with 13 dams, four weirs and eight reservoirs (Bow River Basin Council, 2010).

The inability to obtain new licensed water allocations in the Bow River Basin means that the water needs of housing developers as well as commercial and industrial enterprises wishing to locate therein—including within Rocky View County—must be met by re-allocating existing licenses. To provide some flexibility within the ‘closed basins’, the province established a water license transfer system. Alberta is the only province that allows water to be transferred independently of land and although not particularly active, the water market that has been established does facilitate permanent and temporary transfers of water licenses (Nicol, 2005).

Rocky View County and Calgary have, for most of their histories, experienced varying degrees of animosity over land management (Climenhaga, 1997). But more recently access to water has become the reason for urban-rural tensions. A high-profile example in this context began in 2003 when a case of bovine spongiform

encephalopathy (BSE) prompted the province to consider enhanced meat-packing capability to reduce the need to ship live cattle for slaughter across the border. Political opposition to locating the facility in Calgary resulted in it being located in Rocky View County. At the same time, the County was also advancing a race track, casino and shopping mall development. All these new developments meant Rocky View County needed a permanent license for approximately 2,500 dam<sup>3,1</sup> of water. A logical approach would have been to extend Calgary's existing water infrastructure and water servicing to Rocky View County, but the County refused, perceiving it as an urban infringement on rural territory (Ghitter & Smart, 2009). Ultimately, water was secured in a deal with the nearby Western Irrigation District. In return for \$15 million to replace aging canals with a 50-kilometer pipeline, a portion of the water license was sold, owing to the canal renovation having yielded conservation in water utilization. The price of the transaction—at about \$6,000 per dam<sup>3</sup>—was the highest price paid for water in Alberta at that time (D'Aliesio, 2007). The pipeline that was built deliberately skirted the city, duplicating existing infrastructure, at a cost of \$40 million (Ghitter & Smart, 2009).

Since that time an attempt was made to reach a water sharing agreement between Calgary and Rocky View County through a regional initiative. The initiatives involved the development of a broad land and water management framework involving the voluntary participation of 18 municipalities in the Calgary region. It was called the Calgary Regional Partnership (CRP). Sharing water within the region was to be a central feature of the partnership given the imbalance in water needs versus water licensed allocations. Calgary has enough licensed water to accommodate three times its current population. However, several municipalities in the region, including Rocky View County as noted above, will have insufficient water license allocations to meet population growth by 2030 (CH2M Hill, 2007). An engineering study commissioned by the CRP concluded that a regional system originating from the city of Calgary was technically the preferred option (CH2M Hill, 2007). The CRP initiative, which began in 2005, reached a roadblock, however, when in 2009 Rocky View County, along with two other rural municipalities, left the partnership due to an inability to reach agreement on some key components of the regional plan that were emerging. Since then, mediation efforts have been used to try to induce the rural municipalities which left the CRP to return to the partnership. To date, this has not occurred. Creating a regional water system within Rocky View County itself is, however, being considered by the County (Vince Diot, personal communication, August 21, 2014).

### **3.0 Study Design**

Given the closure of the Bow River Basin to new water allocations and the failed attempts to work with Calgary to provide water servicing, Rocky View County faces challenges in accessing water. This study focuses on the issue of water management within the context of providing water to new and growing communities to accommodate the County's population growth. The over-arching research question explored in this study is—what is the nature and adequacy of current and potential future responses to water supply challenges in order to accommodate population and commercial and industrial growth in Rocky View County?

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<sup>1</sup> dam<sup>3</sup> is a volume 10 meters by 10 meters by 10 meters, or 1,000 cubic meters, or 0.811 acre feet

Water co-operatives and private systems, the main providers of water to residents in the County, is the first group of interest in this study. Evidence suggests some water co-operatives and private systems are working to accommodate increased community water demands by increasing their water licenses through purchasing water license allocations from other license holders (Vince Diot, personal communication, August 21, 2014). Some new communities are being created entirely by housing developers who themselves are responsible for securing sources of water before they commence building. Evidence suggests they too are searching for water licenses (Nicol & Nicol, 2015). Housing developers are therefore the second group of interest in this study. The third group that is of interest to this study are those who are broadly responsible for managing growth, as well as the provision of water to accommodate it—the elected County councillors of Rocky View County. They have been working to acquire water for the County through agreements with irrigation districts as well as a—unsuccessful—regional approach to water sharing, as discussed earlier.

Ethics approval to conduct the study was received from the University of Lethbridge on October 7, 2014. In total 85 mail-out questionnaires were distributed on October 17, 2014. The targeted individuals consisted of: (a) 61 co-operative and private system managers for whom contact information could be located—herein identified as ‘water managers’; (b) 15 housing developers who were identified as being involved in housing development in the County; and (c) nine currently-elected members of Rocky View County council. On October 30, 2014 a reminder postcard was sent to the 85 survey recipients.

#### **4.0 Study Results**

In total 30 questionnaires were completed and returned for a response rate of 35 percent. Responses were received from each of the three groups: 21 from water managers, five from housing developers, and four from county councillors. In seeking to establish general themes, the results were analysed in total. Results were then analysed within each of the three groups, in order to compare and contrast responses.

This study represents a case-study of a single County that also contains small sample sizes, especially for housing developers and county councillors. Therefore, the results need to be interpreted carefully and cannot be broadly extrapolated. The findings are best interpreted as indicators rather than concrete conclusions.

##### ***4.1 Water Challenges—Extent, Source and Effectiveness of Response***

The first set of questions explored perceptions of the extent of the water challenges in Rocky View County, the source of those challenges, and the current effectiveness and future ability of water managers to meet those challenges. The study also explored the broader effectiveness of the Rocky View County and the provincial government in managing water. Respondents were asked to assign weights to their answers using a rating system of 1 to 5, with one being very low and five being very high.

Overall, respondents ranked the extent of water challenges in the County relatively high, with an overall ranking of 3.9. Housing developers were the most pessimistic, with a rating of 4.6, compared to water managers of 4.1, and noticeably more concerned than county councillors who ranked water challenges at just 2.5. Thus, housing developers seem noticeably more concerned with water challenges than county councillors and somewhat more concerned than the water managers themselves.



The next set of questions explored the source of the County’s water challenges, whether the challenges are related to population growth and commercial and industrial growth. The results are presented in Table 1. Overall, water challenges were weighted evenly as coming from population growth and commercial and industrial growth with an average ranking of 3.1 and 3.0 given to the two factors respectively. However, while water managers and housing developers ranked both the sources of water challenges basically evenly, county councillors ranked population growth noticeably higher, at 4.0, compared to commercial and industrial growth at 2.8. Hence, there does not appear to be consensus amongst these groups as to where the source of water challenges lies.

Table 1. *Source of Water Challenges—Average Ranking*

<b>Source</b>	<b>Total</b>	<b>Water Managers</b>	<b>Housing Developers</b>	<b>County Councillors</b>
Population	3.1	3.5	2.6	4.0
Commercial and Industrial	3.0	3.1	2.6	2.8

Source: Authors.

Central to the study are the views related to the effectiveness of water managers in meeting current water demands, as well as their potential effectiveness in the future. As Table 2 below demonstrates, overall water management’s current effectiveness is rated higher (3.2) than expectations of future effectiveness (2.8). In term of current effectiveness, water managers themselves and county councillors rated water management effectiveness almost the same at 3.4 and 3.5 respectively. Housing developers were not as positive, however, rating water managers’ effectiveness a relatively low 2.8.

Perhaps most concerning is the result that water managers themselves rated their future effectiveness the lowest of the three groups, a ranking of just 2.6. Housing developers were not much more optimistic, with a ranking of 2.8. County councillors expressed the most confidence in co-op’s future effectiveness, substantially higher at 3.8. Therefore, at least from this preliminary study, there appears to be a lack of confidence by water managers themselves in meeting future challenges, a skepticism shared by housing developers. County councillors, however, appear to have more faith in co-op managers to effectively cope in the future.

Table 2. *Water Managers Effectiveness—Average Ranking*

<b>Time-Frame</b>	<b>Total</b>	<b>Water Managers</b>	<b>Housing Developers</b>	<b>County Councillors</b>
Current	3.2	3.4	2.8	3.5
Future	2.8	2.6	2.8	3.8

Source: Authors.

Since Rocky View County and the provincial government also have responsibilities in water management, views as to the effectiveness in water management of these two entities were also elicited. The results are summarized in Table 3 below.

Overall, the effectiveness of Rocky View County in meeting water challenges was given a low ranking of 2.1. Housing developers’ responses were particularly negative, providing a ranking of just 1.4. Water managers were almost equally as negative, giving councillors a ranking of 2.2. County councillors themselves, however, believe the County is doing a better job, rating the County’s effectiveness at 3.3.

In ranking the province on their effectiveness in water management, that overall rating was also low, but slightly more positive than for the County, at 2.3. Housing developers and water managers rated the provincial government’s performance at slightly higher than they rated the County—1.8 and 2.3 respectively. County councillors ranked the province’s effectiveness lower than the County’s effectiveness at 2.8. Thus, across the board, the performance of the County and the provincial government is considered poor to moderate.

Table 3: *County and Government Effectiveness—Average Ranking*

Sector	Total	Water Managers	Housing Developers	County Councillors
County	2.1	2.2	1.4	3.3
Government	2.3	2.3	1.8	2.8

Source: Authors.

#### 4.2 Consequences

A subsequent set of questions explored the consequence of water challenges in the County by asking if water will curtail housing and industrial and commercial development. There was significant divergence of opinion amongst groups as denoted in Table 4 below. Most notable is that housing developers strongly believe housing development will be curtailed—a rating of 4.6. They also believe industrial and commercial development will similarly suffer, at a 4.6 ranking. Water managers were not as pessimistic as housing developers but still ranked housing and industrial and commercial curtailment above average at 3.2 and 3.5 respectively. This contrasts sharply with county councillors who expressed little concern that water will curtail housing development, ranking curtailment at 2.0. They are somewhat more concerned about industrial and commercial curtailment, but still only ranked their concern at 2.8.

Table 4: *Consequence of Water Challenges—Average Ranking*

Curtailement	Total	Water Managers	Housing Developers	County Councillors
Housing	3.0	3.2	4.6	2.0
Commercial and Industrial	3.5	3.5	4.6	2.8

Source: Authors.

### 4.3 Potential solutions

In exploring the preference for various options in meeting water challenges in the County, five choices were presented: (a) water co-ops and private systems obtaining water licenses through the water market; (b) the County obtaining additional water licensed allocations from the Western Irrigation District (WID); (c) the County entering into a water sharing arrangement with the city of Calgary; (d) the County developing its own regional agreement; and (e) the prospect of the government re-opening the Bow River basin to new water license allocations. Respondents were asked to answer ‘yes’ or ‘no’ to the likelihood of the options meeting future water demands in the County. A summary of the results is presented in Table 5 below.

Table 5: *Likelihood of Option Meeting Water Demand: Percentage*

Option	Total		Water Managers		Housing Developers		County Councillors	
	Yes	No	Yes	No	Yes	No	Yes	No
Buy License	40	60	25	75	60	40	75	25
WID	24	76	20	80	40	60	50	50
Calgary	36	64	45	55	40	60	0	100
Sharing								
Regional System	56	44	50	50	80	20	50	50
Re-open Basin	52	48	55	45	40	60	50	50

Source: Authors.

The broad theme emerging from these results is that no one potential solution received wide-spread support across the three groups. Forming a regional water system and re-opening the Bow River Basins received the most positive responses yet these solutions were not resounding since close to an equal number of respondents answered ‘no’ to these options. Highly negative responses were elicited when asked to rank the willingness of the WID selling a water license allocation—76 percent said ‘no’—followed by entering into a water sharing agreement with Calgary—64 percent said ‘no’. Nor was there resounding affirmation for the prospect of water co-ops and private systems obtaining new water license allocations through the water market.

Affirmation to forming a regional—Rocky View County—water system under an umbrella organization was given by 56 percent of respondents and re-opening of the Bow River Basin to new water license allocations was affirmed by 52 percent. Yet, close to an equal number of respondents did not think these options would meet future water demands. Forty four percent of respondents answered ‘no’ to a regional water system and 48 percent responded no to re-opening the Bow River Basin.

Aside from the lack of common support for a solution, there is considerable variation in preferences to the various options when results are considered on a group by group

basis. For example, the ability of water co-ops and private systems to buy water license allocations was not considered to be an option by 75 percent of water managers yet was considered a viable option by 75 percent of County councillors. The potential for the County to enter into an agreement with Calgary was viewed positively by about half the water managers and housing developers yet all the County councillors answered ‘no’ to this option.

Amongst water managers, the largest number of respondents believes that re-opening the Bow River Basin will meet future water demands in the County—55 percent said ‘yes’. Yet, this would require provincial government decision-making, and there has been no indication that the government is prepared to undertake such a measure. For housing developers, the option with the most positive response was the development of a regional system, supported by 80 percent of respondents. For County councillors, the option most strongly supported was the buying of water license allocations, supported by 75 percent of respondents. Again, these results indicate a lack of a common view of the potential for various measures to meet future water demand.

## **5.0 Conclusions and Recommendations**

As noted earlier, this case-study of a single County with small survey sample sizes suggest findings be considered as indicators rather than concrete conclusions. One indicator emerging from this study relates to a lack of consensus as to the sources of the water challenges facing Rocky View County, or the consequences of such challenges. Most notably, County councillors appear to be far less concerned about water issues compared to the housing development sector. Similarly, County councillors expressed less concern over potential constraints on housing, commercial and industrial development relative to housing developers. These differences may be attributed to councillors’ proclivity to act as promoters of their municipality, to express confidence and optimism. Alternatively, housing developers face day-to-day challenges in dealing with water supply constraints. They are on the ‘sharp end’ of the water supply issue given that projects can be delayed, scaled down, or even terminated if water is unavailable.

In terms of water managers’ effectiveness, housing developers and County councillors responded relatively positively. Alternatively, the effectiveness of Rocky View County and the provincial government in managing water was not given a positive endorsement by water managers and housing developers. With respect to Rocky View County effectiveness, the results may reflect disappointment in the County’s inability to work with Calgary to resolve water issues. The results may also reflect a previous study’s finding that turning to alternative water sources has been very expensive (Nicol, 2013). Regarding the provincial government’s effectiveness, the results may reflect evidence also found in the aforementioned study that frustration exists amongst Albertans over lack of decisive or concrete measures when it comes to provincial government action and water management (Nicol, 2013).

In exploring potential solutions for the future, no common solution emerged amongst the groups. However, amongst five potential options, forming a regional umbrella water organization within the County seemed to be the solution with the most support. There was significant divergence of opinion as to the potential of buying water license allocations, or entering into an agreement with Calgary to solve the County’s water issues. This divergence may be attributed to lack of awareness and experience. For example, the fact that very few water managers view buying water licenses as an option, compared to County councillors, may relate to more

experience on the part of managers in searching for licenses and hence awareness of limited availability. Similarly, County councillors' unanimous rejection of Calgary sharing its water, compared to the optimism shown by water managers, may relate to councillors' greater awareness of the complex and thorny political challenge inherent in that option.

Perhaps the most troubling indicator emerging from these results is water managers' lack of confidence in themselves to meet future water challenges, a view also shared by housing developers. Yet, County councillors responsible for county management think managers are up to the challenge. This finding suggests a need for improved communication amongst the three sectors surveyed in this study. If water managers are to succeed in adjusting to new water realities to meet the needs of sectors such as housing developers, they will have to work with the County, so everyone gains a common appreciation of the problem and works to develop a unified strategy. Given housing developers' experience on the ground, they can help inform that strategy. An approach which appears to have the most support is forming a regional umbrella water organization; an approach already being considered by the County. However, given that there is a variety of options, and different understandings of the existence and nature of challenges, a winning strategy might include more than one of the approaches considered here.

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