

Arrowsmith Water Service Englishman River Water Intake Study Phase 1 – Conceptual Planning

Discussion Paper 2-1 – Watershed Management

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1 Introduction

Kerr Wood Leidal (KWL), in partnership with Associated Engineering and Koers and Associates, was retained by Arrowsmith Water Service (AWS) to develop an updated water management framework for the Englishman River, culminating in a water supply strategy and a conceptual design for water supply intake structure and treatment plant.

This paper, prepared under Task 2-3: Watershed Management, provides a general review of previous studies done to date on the Englishman River and its tributaries. It also provides an overview of key stakeholders in the watershed and summarizes key issues. The existing body of work is placed in the context of stakeholder discussions held in October 2009.

2 The Watershed

The Englishman River Watershed is located on the east coast of Vancouver Island, near the City of Parksville. The river drains a watershed area of roughly 324 km² draining the east-facing slopes of Mount Arrowsmith (1820 m) and Mount Moriarty Ridge. The majority of the watershed lies in the Coastal Western Hemlock and Coastal Douglas Fir biogeoclimatic zones with small areas of the watershed above 1,000 m in the Coastal Mountain-Heather Alpine and Mountain Hemlock Zones. The generalized bedrock geology of the Englishman River watershed includes the following major bedrock types: Karmutsen Formation (basalt) from the Late Triassic, Sicker Group (volcanic) from the Paleozoic Period, and Nanaimo Group (sand, gravel, coal) from the Late Cretaceous. Surficial deposits are of glacial origin. The soils within the lower watershed are predominantly loamy sands and sandy clay loams. The watershed has all species of salmon, including steelhead. The Englishman River is designated a sensitive stream by the BC government under the Fish Protection Act. The primary land-uses in the watershed are forestry in the headwaters with agriculture and suburban development along the lower reaches of the river.

3 Background Reports

To provide context to the current water supply planning process, high-level overviews of past studies and plans for the Englishman River watershed are summarized below in chronological order.

3.1 **Integrated Water Study: Englishman River Basin (Chapter Vii) – Chatwin Engineering Ltd., 1987**

This report was prepared for the Regional District of Nanaimo and the Greater Nanaimo Water District. KWL's review was limited to Chapter VII of the larger report.

Chapter VII provides an overview of the hydrology and estimates the storage support required to meet regional water needs and environmental objectives. Available hydrometric data was limited, and the study necessarily makes a number of relatively coarse assumptions in developing streamflow estimates. The lowest monthly mean flows on the 12-year record are used as a design condition, along with an assumed fisheries base flow.

Chapter VII identifies a “first phase” storage requirement of 7,000 ML to support water use on the Englishman River. The chapter also explores the potential storage available at some of the candidate dam sites. Water quality is found to be acceptable for water supply purposes. Potential cost-sharing opportunities are identified if the dam can also provide flood control benefits.

3.2 **Englishman River Water Allocation Plan – BC Ministry of Environment, Lands and Parks – Vancouver Island Region, November 1994**

In the early 1990s, Ministry of Environment staff prepared Water Allocation Plans (WAP) for a number of “allocation areas” on Vancouver Island. These documents typically provide guidance for water licensing decisions, storage requirements and limitations on withdrawals.

The Englishman River WAP summarizes the key hydrologic data available at the time, including local hydrometric, snowpack, and other hydroclimatic records. Of the 37 water licences issued in the Englishman River watershed as of October 1994, the WAP finds that 54% (by volume) are for waterworks purposes. Other major water uses by licence include conservation (21%), storage (20%), and irrigation (2.4%). The WAP notes that growing demand must be balanced against the need to protect an important and varied fish resource.

The WAP concludes that future water licences should authorize diversions only during months when Englishman River streamflow exceeds 60% of mean annual discharge. This corresponds to the period from October through May. Any further diversions during the low flow months of June through September must be fully storage-supported. This applies to

major water users (e.g., waterworks) as well as domestic users drawing as little as 1.1 m³ per day. Arrowsmith Lake is identified as an economically and environmentally attractive site for storage.

The WAP limits demand projections (for water licence applications) to a 10-year planning horizon except where the capital cost of works requires a longer amortization period. Licence applicants must demonstrate that water conservation measures have been implemented.

3.3 Water Licence Application Report – BC Ministry of Environment File No. 1001868, November 1996

The Water Licence Application Report reviews the AWS application as well as input from government and other stakeholders. BC Environment Fisheries Section recommends a minimum discharge of 1.13 m³/s be required at Water Survey of Canada hydrometric station 08HB002, with a longer-term target discharge of 2.12 m³/s. DFO also recommends a minimum discharge target of 1.13 m³/s at 08HB002, and an absolute minimum discharge of 0.71 m³/s under all conditions.

A number of concerns were raised by other stakeholders during the review process. These concerns generally include impacts to senior water licence rights, growth management, water conservation, alternative sources, and the fisheries resource. The Nanoose Indian Band and some other stakeholder organizations expressed varying levels of interest in either joining the water supply system at a later date or developing independent supply systems on the Englishman River. The author recommends a Water Reserve under Section 44 of the *Water Act* to protect these rights.

Based on the reviewer's analysis and feedback received, the reviewer recommends a licence be issued for waterworks and storage purposes subject to a number of special clauses and conditions. The recommended special clauses generally address the following issues:

- intake screens for fish and debris;
- water level and streamflow monitoring;
- restrictions (by date and by Order) on when water may be diverted;
- habitat and access improvements at Arrowsmith Lake; and
- minimum flow releases at the dam (to be determined by an Engineer under the *Water Act*).

3.4 Conditional Water Licence No. 110050 – BC Ministry of Environment – Water Management Branch, March 1997

A joint water licence was issued to the Regional District of Nanaimo, City of Parksville, and Town of Qualicum Beach authorizing:

- annual diversion of up to 1,540,000,000 gal/yr (approximately 7,001 ML/yr);
- maximum daily diversion of 10,550,000 gal/day (approximately 48 ML/day); and
- storage of 7,300 acre-feet per year (approximately 9,004 ML/yr) at Arrowsmith Lake Reservoir.

The licence is subject to the conditions laid out in the Water Licence Application Report. A Provisional Operation Rule for Arrowsmith Lake Reservoir was issued by Order under s. 18, *Water Act*, March 1997. The Order requires a minimum flow release of 1.6 m³/s, subject to additional limitations and constraints. The Provisional Operation Rule was revised by s.18 Order in January 2008.

3.5 Englishman River Watershed Recovery Plan – R.C. Bocking and M. Gaboury, 2001

The Englishman River Watershed Recovery Plan was initiated by Pacific Salmon Endowment Fund Society. Due to the regional importance of the Englishman River Watershed, it was selected as the first watershed to have a completed Watershed Recovery Plan as part of the Georgia Basin salmon recovery planning process for coho and steelhead.

The purpose of the recovery plan was to identify and set priorities actions required to achieve recovery goals for the watershed. The plan reviews current information on fish and fish habitat in the watershed, identifies any information gaps in the information, sets realistic recovery goals and prioritizes recovery actions. The primary recovery actions identified in the plan include:

- public information/education;
- stock assessment for both smolts and adults;
- habitat protection through education and stewardship of land, water and resources;
- habitat rehabilitation focused on instream and riparian rehabilitation and sediment management; and
- monitoring of plan progress through activity effectiveness and recovery evaluations.

Since preparation in 2001, the plan has provided the primary framework for on-going habitat protection and rehabilitation projects on the river.

3.6 Parksville – Qualicum Beach Wildlife Management Area Management Plan – Lanarc Consultants, June 2003

The 2003 P-QBWMA Management Plan updates the original plan prepared in 1996 and provides Ministry of Environment who manage the area with guidance for habitat protection and guidance and to accommodate wildlife viewing and other compatible activities in the area. The 2003 update was prompted by growing pressure on the area from increased population growth and tourism as well as the expansion of the area along the Englishman River/Morrison Creek corridor. One of the main goals of the P-QBMA Management Plan is the shared stewardship of the province's natural diversity and habitats within the area. Therefore a large number of stakeholders were involved in the plan development including the Canadian Wildlife Service, Fisheries and Oceans Canada, Nature Trust of B.C., Nanoose and Qualicum First Nations, Regional District of Nanaimo, City of Parksville, Town of Qualicum Beach, the Pacific Salmon Foundation, several local environmental organizations, and the local resort and tourism sector.

The P-QBWMA is a 1024 ha area encompassing the coastal foreshore, estuary and river habitats between Craig Bay and the Little Qualicum River. Of primary interest to the AWS, the area encompasses the Englishman River Estuary Management Unit covering an area of 130 ha (114 ha owned by Natures Trust or the Province) and the Englishman River Corridor Management Unit extending 14 km upstream from the Englishman River Estuary to the North Boundary of the Englishman River Falls Park, which includes areas that are publicly owned or owned by Natures Trust.

The plan identifies key goals, reviews current state of habitat and wildlife use, reviews current uses in the area and outlines a structure for moving forward with plan initiatives. The main focus of the plan is on re-establishing a management structure for the area, identifying funding opportunities and outlines some key projects including habitat enhancement, public access and public education. The plan does identify water use as a key issue in the area. However, no specific recommendations on water use are provided in the plan.

3.7 Letter to Mike Squire, Arrowsmith Water Service Dated June 24, 2009 – P. Marquis, A/ Regional Water Mgr, BC Ministry Of Environment – Water Stewardship Division

The June 24, 2009 letter authorizes use of a reservoir rule curve zone chart for Arrowsmith Lake Reservoir operations through the 2009 water release period. The zone chart provides a relationship between date, reservoir elevation, and minimum flow requirements measured at 08HB002. In some cases the minimum flow may be less than the 1.6 m³/s required by the January 2008 Provisional Operation Rule.

The rule chart was accepted by representatives of AWS, MoE and DFO at a meeting held June 23, 2009.

4 Key Stakeholders

A range of stakeholders from local government, provincial government, First Nations, industry, non-governmental organizations and local stewardship groups are interested in water supply and are actively participating in the stewardship of the Englishman River Watershed. A summary of the roles and concerns for the stakeholders is included in Table 1. The primary stakeholders include:

4.1 Local Government

4.1.1 City of Parksville

The City of Parksville is located near the mouth of the Englishman River. The City supplies water to a population of approximately 11,500 people. This water demand is partially supported by withdrawals from the Englishman River. The City is a member of the AWS and operates existing water supply facilities (Arrowsmith Dam, Englishman River Water Intake) on the Englishman River.

4.1.2 Town of Qualicum Beach

The Town of Qualicum Beach is located to the west of Parksville. The Town supplies water to a population of 8,900 people. Currently, this water demand is supported from ground water withdrawals. However, the Town is currently a member of the AWS and may support future water demand through withdrawals from the Englishman River.

4.1.3 Nanaimo Regional District

The Nanaimo Regional District administers the unincorporated lands surrounding the City of Parksville and the Town of Qualicum Beach. The RDN supplies water to approximately 4,800 residents living in Nanoose Bay (Electoral Area E) and approximately 600 residents living in French Creek (Electoral Area G). EPCOR, a private utility, supplies water to approximately 4,100 people living in French Creek. The RDN is a member of the AWS and partially supports water demand in Nanoose Bay through withdrawals from the Englishman River.

Table 1
Summary of Responsibilities and Concerns for Stakeholders in Englishman River Watershed

Stakeholder	Roles	Watershed Concerns
Local Government AWS City of Parksville Town of Qualicum Regional District of Nanaimo	<ul style="list-style-type: none"> ▪ To provide safe and reliable water supply to residents, and visitors. ▪ To plan, manage and operate water supply system in the best interest of the tax payers. ▪ To manage parkland along the lower reaches of the Englishman River for habitat protection and public recreation. 	<ul style="list-style-type: none"> ▪ Protection of water quality ▪ Balancing needs of conservation requirements and water quality with tax payer interests. ▪ Public Access and Security of watershed. ▪ Management of sediment and turbidity
Federal/Provincial Government Ministry of Environment Department of Fisheries and Oceans Vancouver Island Health Authority	<ul style="list-style-type: none"> ▪ To protect water resources and fisheries/wildlife resources in the public interest, through authority given by the Water Act, the Fisheries Act and the Drinking Water Protection Act. 	<ul style="list-style-type: none"> ▪ Maintenance of minimum baseflows in the river for protection of fish habitat. ▪ Mitigation of impacts of construction of instream works on fish habitat. ▪ Minimizing risk to public health through implementing water treatment meeting the provincial drinking water quality guidelines
First Nations	<ul style="list-style-type: none"> ▪ To be a partner in the stewardship of the water, land, fisheries resources and protect the cultural values of the Englishman River Watershed. 	<ul style="list-style-type: none"> ▪ Protection of cultural values of the Englishman River. ▪ Protection of Englishman River fishery
Industry Timberwest Island Timberlands Agriculture	<ul style="list-style-type: none"> ▪ To manage forest and agriculture lands in the watershed using best practices for the protection of water quality. ▪ To manage forest resources in the watershed for the long term interest of shareholders and the community. 	<ul style="list-style-type: none"> ▪ Public Access and Security of lands in the watershed ▪ Need to consider all land uses in the watershed and impacts on water quality.
Non-governmental Organizations Ducks Unlimited Canada Natures Trust BC Conservation Foundation	<ul style="list-style-type: none"> ▪ To protect and enhance habitat in the Englishman River Watershed through developing partnerships and implementation of protection/enhancement projects ▪ To manage recently protected lands along the lower reaches of the Englishman River for habitat protection and public recreation. 	<ul style="list-style-type: none"> ▪ Maintaining and protecting habitat areas. ▪ Impacts of reduced flows on river and estuary habitat, ▪ Balancing needs of conservation requirements and with need for water supply.
Local Stewardship Groups Mid-Island Habitat Enhancement Society Arrowsmith Watersheds Coalition Mount Arrowsmith Biosphere Foundation	<ul style="list-style-type: none"> ▪ To promote the protection of water quality and enhancement of fish and wildlife habitat in the Englishman River Watershed through public education and lobbying of decision makers. 	<ul style="list-style-type: none"> ▪ Continued focus on protection of habitat in the Englishman River.

In addition, the RDN manage and operate both the Englishman River Regional Park as well as the Mount Arrowsmith Massif Regional Park, both located in the Englishman River watershed.

4.2 Provincial Government

4.2.1 Ministry of Environment

The Provincial Water Act grants authority to the Ministry of Environment to issue water licences for diversion of surface water. Currently, the AWS hold water licence to withdraw up to about 7,001 ML/year at a maximum rate of 48ML/day for water supply purposes. Any additional withdrawal beyond this amount would have to be approved by the Ministry of Environment Water Stewardship Division. In addition, any significant change in the location of the point of diversion would have to be reviewed and approved. As part of the approval process, any water licence application would be reviewed by the Environmental Stewardship Division to assess impacts to resident fish species.

4.2.2 Vancouver Island Health Authority

Under the Provincial Drinking Water Protection Act, the Vancouver Health Authority evaluates, assesses and issues Construction Permits for construction, alteration or extensions of water treatment plants, reservoirs, disinfection systems and water transmission and distribution systems. Any changes to the existing water supply system on the Englishman River will have to be reviewed and approved by VIHA. Their primary concern is protection of public health and the need for potable water system to meet or exceed the drinking water protection guidelines.

4.3 Federal Government

4.3.1 Department of Fisheries and Oceans

Under the Subsection 35(2) of the Federal Fisheries Act, DFO must review proposed in-stream works to determine if the project could lead to Harmful, Alteration, Disruption or Destruction (HADD) of fish habitat. If impacts are determined to cause HADD, then DFO has the authority to require applicants to provide compensation for the HADD.

DFO also manages and maintains side channel habitat restoration projects along the lower reaches of the Englishman River.

4.4 First Nations

4.4.1 Snaw'Naw'As (Nanoose) First Nation

The Englishman River lies in the Traditional Territory of the Snaw'Naw'As (Nanoose) First Nation. The Snaw'Naw'As First Nation has a total registered population of 225 with 150 living on reserve located on the shores of Nanoose harbour, outside the Englishman River Watershed. The First Nation has interests in protecting the cultural values of the Englishman River and the watershed as well as protection of fisheries resources. The First Nation is a member of the Te'Mexw Treaty Society.

4.5 Industry

4.5.1 Timberwest/Island Timberlands

At 85% of the watershed area, Island Timberlands and Timberwest own and manage the largest landmass in the watershed. Island Timberlands is the largest land-holder while Timberwest owns and manages lands in the southern section of the watershed near the headwaters of the South Englishman River.

Both forest companies have developed best practices for forestry to minimize erosion, and protect water quality in the watershed. These have been developed in co-operation with the Private Forest Managed Land Council.

Due to increased use of their lands for recreation, they have concerns over public access and security of the watershed due to vandalism, and forest fire risk.

4.5.2 Agriculture

Although no formal association exists to represent the agricultural land owners in the watershed, agriculture is one of the primary land uses in the watershed after forestry. Both small scale (single family farms and hobby farms) and larger scale agriculture (dairy farms) are located in the Morrison Creek catchment to the north of the Englishman River mainstream.

4.6 Non-Governmental Organizations

4.6.1 Ducks Unlimited Canada

The goal of Ducks Unlimited Canada is to conserve wetland habitat and waterfowl through work on the ground (habitat enhancement, property acquisition, and conservation covenants), wetland habitat research and education. DUC have been

involved with conservation of the Englishman River Estuary through purchase of 55 ha. of the estuary lands. These lands are now managed by Natures Trust.

4.6.2 Natures Trust

The mandate of the Natures Trust is to protect British Columbia's natural diversity of wildlife and plants and their critical habitats through the acquisition and management of ecologically sensitive lands. Natures Trust has been involved with the stewardship of the Englishman River since the early 1980s. Since that time, Natures Trust through partnerships with other stewardship groups, government and the forest industry have protected more than 280 ha of land along the lower reaches (about 8 km) of the Englishman River. This has been accomplished through fee simple land acquisitions, donations of land and conservation covenants, and lease of selected conservation lands. The primary units managed by Natures Trust are the Englishman River Estuary, South Bank Block 564, North Bank Block 602 and the Englishman River Covenant. This has created a continuous corridor of protected land from the Island Highway Bridge to the confluence of the South Englishman River and the Englishman River mainstream.

4.6.3 British Columbia Conservation Foundation

The mission of the BC Conservation Foundation was founded in 1969 to promote and assist in the conservation of the fish and wildlife resources of the Province of British Columbia through the protection, acquisition or enhancement of fish and wildlife habitat. Since 2006, their primary mandate on Vancouver Island is to implement the goals of the Living Rivers – Georgia Basin Business Plan. This has led to several habitat enhancement and monitoring projects on the Englishman River. The BCCF has been successful in working with many watershed partners in moving forward with enhancement and watershed protection initiatives.

4.7 Local Stewardship Groups

4.7.1 Mount Arrowsmith Biosphere Foundation

The vision of the Mount Arrowsmith Biosphere Reserve Foundation is to achieve sustainable balance between the sometimes conflicting goals of conserving biological diversity, promoting economic development and maintaining associated cultural values. Their main purpose is the establishment and on-going management of the Mount Arrowsmith Biosphere Reserve, recognized by UNESCO under its Programme on Man and the Biosphere in 2000. Under this program, the design of the reserve must include a core legally protected area, a buffer area where non-conservation

activities are prohibited and a transition zone where approved practices are permitted. The Mount Arrowsmith Biosphere includes the areas surrounding Mount Arrowsmith, including the watersheds of the Little Qualicum River, French Creek, Englishman River, Nanoose Creek and Bonillo Creek (118,592 ha). The area has several legally protected core areas, including the Englishman Falls Provincial Park, the Parksville-Qualicum Wildlife Management Area and the Englishman River Regional Park within the Englishman River Watershed. Recently, the establishment of the Mount Arrowsmith Massif Regional Park at the headwaters of the Englishman River has added an additional 1,300 ha of protected land to the biosphere. The park will be managed by the Regional District of Nanaimo in co-operation with the Hupacasath First Nation of the Alberni Valley, Federation of Mountain Clubs of BC, and the Alpine Club of Canada.

4.7.2 Arrowsmith Watersheds Coalition Society

The Arrowsmith Watersheds Coalition Society is an organization of community volunteers committed to helping ensure that our watersheds, rivers, and groundwater sources can provide for water needs now and in the future. Their primary focus is protection of surface and ground water quality for water supply in the Parksville and Qualicum Beach area through public education and lobbying of decision makers.

4.7.3 Mid-Vancouver Island Habitat Enhancement Society

The mission of the MVIHES is conservation and restoration of habitat related to salmon including watersheds, estuaries and shorelines. Connecting people to their landscape through partnerships focusing on field study, education and restoration. The membership of the Society are local residents, who are involved with habitat restoration projects and public education. They are involved with several committees including the Englishman River Watershed Recovery Plan Steering Committee, Advisory Committee for the Georgia Basin/Vancouver Island Living Rivers Fund Advisory Committee and Regional District of Nanaimo Drinking Water - Watershed Protection Stewardship Committee

5 Primary Issues

In summary, the primary watershed issues that will need to be considered as part of the development of the AWS protection are:

- protection of water quality from sedimentation, contamination, and other land use related issues;
- balancing conservation with water supply needs;

- maintaining minimum fish flows and protecting habitat;
- providing water that meets drinking water guidelines;
- limiting public access to reduce risk of contamination and forest fire;
- control land-use to protect water quality; and
- protect habitat conservation areas.