Water Supply
FACTSHEET

BRITISH COLUMBIA | Ministry of Agriculture, Food and Fisheries

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GUIDANCE ON FARM WATER STORAGE

Farmers in British Columbia often need storage facilities to supply farmstead water or to support water licences from surface or groundwater sources that do not provide sufficient flow during summer months. The effects of climate change may reduce summer water supplies which can be mitigated through the development of a storage facility. Water storages can be on either private or crown land, but a licence will be required to store water that is vested to the Province. All water that enters a stream or groundwater is vested to the Province. If Crown Land access is required, then the licence may be accompanied by a Permit or a Land Act tenure that provides permission to access Crown Land.

The ***Water Sustainability Act*** and the ***Dam Safety Regulation*** govern the storage of water and the construction of a storage facility. Both statutes came into effect on February 29, 2016, replacing the former B.C. *Water Act* (1909) and the B.C. Dam Safety Regulation (2000).

Storages can be in the form of dugouts, reservoirs with small berms, or large reservoirs behind a dam. The rules and regulations that must be followed will depend on the type of storage facility being built. This factsheet provides clarity to the above statements.

1.0 WATER SUSTAINABILITY ACT

The B.C. *Water Act* vested all surface water in the Crown and established that anyone who diverted and used surface water needed to be authorized. The *Water Sustainability Act* (WSA) repealed and replaced the *Water Act* on February 29, 2016 and, among other items, introduced the requirement to license all non-domestic groundwater use. There are a number of regulations and policies that have been developed or are in the process of being developed to coincide with the delivery of the WSA for providing further clarity and guidance on water management in British Columbia. Under the WSA, the diversion, use or storage of surface water and groundwater requires an authorization through a licence or use approval, unless the use is allowed through an exemption in the Act or under a regulation.

Therefore, in most cases, storage facilities will require a licence to store water. Storage facilities typically collect water during times of excess water (e.g., spring freshet) to be used during periods of scarcity (e.g., summer). If water is taken from a surface or groundwater source, the time period allowed for diversion to store water will be outlined in the licence. It should also be pointed out that a licence for the use of the water from a licensed storage facility will also be required. Therefore, a licence is required to store water and a subsequent licence to use it.

There are, however, situations where a storage licence may not be required, which will be described in this factsheet.

1.1 Situations That Require A Storage Licence

1.1.1 Use of Stream Water

All reservoirs (natural or constructed) that take water from a stream to fill the facility will need a storage licence. The subsequent water use purpose (e.g., irrigation) also requires a water licence.

A licence will be required for all water use purposes including domestic, irrigation and other uses, such as, storage for oil and gas hydraulic fracturing ("fracking"). Furthermore, if the dugout is constructed in a stream, there are additional requirements under Section 11 'Changes in and about a Stream' of the Water Sustainability Act.

1.1.2 Use of Groundwater for a Non-Domestic Purpose

A dugout filled with groundwater that is used for domestic purposes only does not require a licence. Other purposes, such as, irrigation, stock watering, hydraulic fracking, etc. will require the storage facility to be licensed as well as the use of water. A complete list of water use purposes is described in the WSA.

- **Water Use Purposes**
  In situations where water supplying a dugout requires a licence, the licence must specify all of the applicable water use purposes. If water in a dugout is being sold to other users, the licence must include a "waterworks purpose" to lawfully supply the water to other parties. A licence can have multiple purposes, however, fees and rentals are charged to the licence holder for each purpose that appears on the licence.

- **Seepage and Drainage Water Supply**
  Dugouts used for non-domestic purposes that are filled with water from agricultural drain tiles or water from seepage may require a storage licence. Although drain tiles are shallow, they are considered to effectively intercept groundwater. Dugouts capturing seepage function like a shallow well and are therefore being filled by groundwater. The use of the water from the dugout will also need to be licensed unless it is used for domestic purposes.

- **Livestock Watering**
  Storage facilities that are used to supply water for livestock must be licensed if they are filled with surface water from a stream or water pumped from an aquifer.

The takeaway message is that if water has been vested to the Province, which is all water in a stream (surface water) or aquifer (groundwater), then the storage and use of that water must be licensed, unless exempted by legislation or regulation.

1.2 Situations That Do Not Require a Storage Licence

1.2.1 Surface Runoff Supply

Water that originates as overland flow and has not consolidated into a stream or percolated into the ground to become groundwater is not yet vested to the Province and can be stored and used without requiring a licence. Storage can be in the form of a dugout providing it is made with impermeable material or other type of storage facility (e.g., tanks).

Figure 1.1 Samples of Surface Runoff Collected in Constructed Ponds

In addition, a dugout supplied by surface runoff from a private property (e.g., rainwater that falls onto the dugout or collected from a rooftop) does not require a licence regardless of what the water is used for. This can include runoff from barns, greenhouse roofs or other structures, and rainwater or snow melt runoff from private property during times of excess water flow prior to entering a stream or an aquifer.

If the surface runoff is collected in a dugout that also receives water from a watercourse or an aquifer, a storage licence is required for the portion of water collected that is vested in the Province.

The Province may require the water user to demonstrate that a dugout does not source or intercept water flows affecting stream flow or water that has already entered the ground. For example, a spring that is piped into a dugout would be sourcing vested water and may require a licence.

1.2.2 Groundwater Supply

A dugout that is supplied by groundwater and is used only for domestic purposes does not require a storage licence. Domestic purpose means water used typically for a single household, including water for pets, animals or poultry for household use, and irrigation of a garden or lawn measuring less than 1,000 m^2 (about ¼ acre) that is adjoining the home property. Groundwater used for a domestic purpose can be supplied to the dugout by a well, seepage into the dugout or drain pipes (also commonly known as drain tiles) installed below the surface of agricultural fields without requiring a storage licence.

The WSA establishes any water that has entered the ground to be groundwater and is therefore subject to authorization requirements if it is collected into a dugout or storage facility or used for a purpose that requires a licence under the WSA. Dugouts that are filled by seepage generally should not require a licence for storage, since water can enter and leave the facility based on the groundwater level. This type of facility

is more like a large dug well rather than a storage facility. Use of the water from this type of facility for non-domestic use would require a licence for water use as the water would be deemed groundwater.

The takeaway message is that most sources of water, and most uses of water are vested in the Province and require an authorization. If the water has not entered a stream or an aquifer, it has likely not been vested to the Province and a licence for storage is not required. Unless explicitly exempted by legislation or regulation, a person must obtain an authorization to divert, use and/or store groundwater. The dugout and well should be included as part of the works referenced in the authorization.

Note: **Farms that have more than one dugout or well can apply for one licence that can cover all wells and dugouts providing they are on the same farm.**

2.0 DAM SAFETY REGULATION

2.1 Minor Dam

Regardless of whether a storage licence has been applied for or received, all dams or berms are subject to the Dam Safety Regulation except for the following which are considered minor dams:

- The dam is less than 7.5 m in height; and
- The maximum storage behind the dam at full supply does not exceed 10,000 m^3.

The comptroller or water manager may, at their discretion, order that the regulation applies to a minor dam if it is felt that the facility is potentially hazardous to public safety, the environment or land, and property.

The owners of all dams must comply with the following:

- Inspect, maintain and repair the dam and related works to ensure that the facility remains in good operating condition to meet the dam safety requirements; and
- The owner of the dam must take reasonable care to avoid the risk of significant harm while operating, maintaining or repairing defects to the facility with respect to public safety, the environment or land, and property.

2.2 Larger Dams

The Dam Safety Regulation applies to all dams in the following categories:

- The dam is more than 1 m in height and is capable of a full supply storage volume in the reservoir greater than 1,000,000 m^3;
- The dam is more than 2.5 m in height and is capable of a full supply storage volume in the reservoir greater than 30,000 m^3;
- The dam is greater than 7.5 m in height; and
- The dam has a classification of significant, high, very high or extreme.

All dams that are not categorized as minor must follow the regulation. The dam owners are therefore required to determine the classification of the dam and submit the classification to the Dam Safety Officer. The classification categories are based on dam failure consequences with respect to population at risk, loss of life, environment and cultural values and infrastructure and economic impacts. Depending on the classification determined, submitted to and accepted by the Province, the dam owner may be prescribed various terms and conditions to satisfy dam safety requirements.

For example, many reservoirs that have been built for greenhouses or cranberry operations would fall into one of the first two categories and would be subject to the Dam Safety Regulation.

If the storage facility is considered low risk as determined by the owner and agreed to by the Dam Safety Officer, the requirements under the regulation are significantly less. A short summary of the classifications is as follows:

2.2.1 Low Risk Classification

Low risk means there is no identifiable population at risk; no possibility of loss of life; minimal short-term loss or deterioration of important fisheries habitat, endangered species, unique landscapes or sites of cultural significance; and minimal economic loss which is mostly limited to the dam owner's property.

2.2.2 Significant Classification

Significant classification means there may be population at risk when people are only occasionally and irregularly in the dam breach inundation zone; low potential for multiple loss of life; no significant loss or deterioration of important fisheries habitat, endangered species, unique landscapes, sits with significant cultural value and restoration or compensation in kind is highly possible; and commercial facilities or some destruction or damage to locations used occasionally for temporary purposes.

2.2.3 High Classification

High classification means there may be permanent population at risk where people are ordinarily or regularly in the dam breach inundation zone; loss if life is 10 or fewer; significant loss or deterioration of important fisheries habitat, endangered species, unique landscapes, sits with significant cultural value and restoration or compensation in kind is highly possible; and high economic losses affecting infrastructure, transportation services, commercial facilities or some destruction or damage to scattered residential buildings.

2.2.4 Very High Classification

Very High classification means there may be permanent population at risk where people are ordinarily or regularly in the dam breach inundation zone; loss if life is 100 or fewer; significant loss or deterioration of critical fisheries habitat, endangered species, unique landscapes, sits with significant cultural value and restoration or compensation is possible but impractical; and very high economic losses affecting infrastructure, transportation services, commercial facilities or severe destruction or damage to residential areas.

2.2.5 Extreme Classification

Extreme classification means there may be permanent population at risk where people are ordinarily or regularly in the dam breach inundation zone; loss if life is more than 100; major loss or deterioration of critical fisheries habitat, endangered species, unique landscapes, sits with significant cultural value and

restoration or compensation is impossible; and extremely economic losses affecting critical infrastructure, transportation services, commercial facilities or severe destruction or damage to residential areas.

There are too many variables outlined in the regulation to state in this factsheet. Further information can be found in the Dam Safety Regulation.

The takeaway message is that if the dam or berm is determined not to be a minor dam, a classification of the facility is required. The classification must be submitted to the Province and the Dam Safety Officer (DSO) will conduct a review. The DSO will also provide documentation that describes the responsibilities of the dam owner based on the classification.

3.0 AGRICULTURAL LAND COMMISSION

The *Agricultural Land Commission* (ALC) *Act* allows dugouts or reservoirs in the Agricultural Land Reserve (ALR) if they are consistent with farm practices, such as, irrigation and livestock watering. However, if storage structures for non-farm use are located on land within the ALR, authorization for non-farm use is required under Section 20 of the *ALC Act*. Dugouts constructed to provide water for other uses, such as, for fracking purposes, will require authorization from the ALC.

4.0 DUGOUT STORAGE CONSTRUCTION OPTIONS

There are many options with respect to the location and sizing of a dugout. The options selected will have licensing ramifications, as shown in the following scenarios.

The content of this section is an excerpt from the policy document "Water Authorization Requirements for Dugout Structures" developed by BC Ministry of Environment and Climate Change Strategy (ENV), and BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) and effective on September 1, 2017.

4.1 Water Diverted from a Stream

Authorization Required: Unless explicitly allowed by legislation or regulation, the water use must be authorized and an authorization obtained for diversion, use and/or storage and the dugout should be included as part of the works referenced in the authorization. With respect to the dam constructed to retain the water, please consult with the Dam Safety Program as the berm may be subject to the Dam Safety Regulation (see definitions in Section 2.0 Dam Safety Regulation).

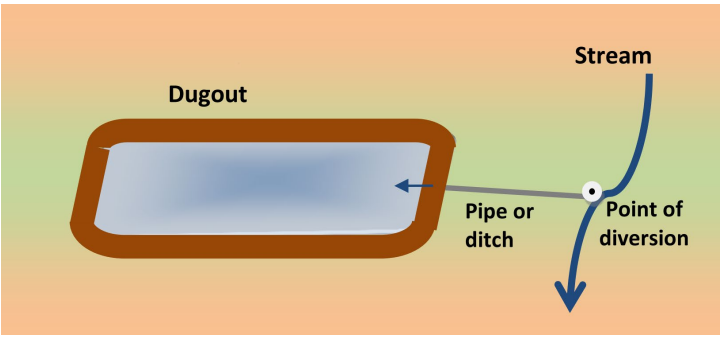

Figure 4.1 Water Diverted from a Stream

Source: "Water Authorization Requirements for Storage Structures" Policy Document, ENV and FLNRORD, September 1, 2017

4.2 Dugout Constructed within a Stream Channel

Authorization Required: Unless explicitly exempted by legislation or regulation, the water use must be authorized to allow the diversion, use and/or storage. The dugout should be included as part of the works referenced in the authorization; additional works (e.g., dam) and conditions for operation as a reservoir may also need to be included in the authorization.

Further, prior to making any changes in and about a stream, including the stream channel, the owner must obtain authority to do so, either as part of the water use authorization, or under a separate change approval. With respect to a dam constructed to divert, store or impound water and/or to serve as an outlet structure, please consult with the Dam Safety Program.

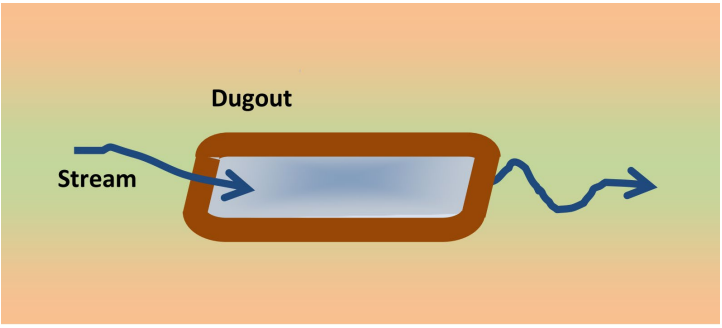

Figure 4.2 Dugout Constructed within a Stream Channel

Source: "Water Authorization Requirements for Storage Structures" Policy Document, ENV and FLNRORD, September 1, 2017

4.3 Groundwater Supply

This scenario includes the diversion of water from a well, spring, aquifer or groundwater that seeps into the dugout.

Authorization Required: This applies to water that is pumped into the dugout from a dug or drilled well or the dugout intercepts percolating or flowing aquifer water, which is then impounded or stored in the dugout.

Unless explicitly exempted by legislation or regulation, a person must obtain an authorization to divert, use and/or store groundwater. The dugout and well should be included as part of the works referenced in the authorization.

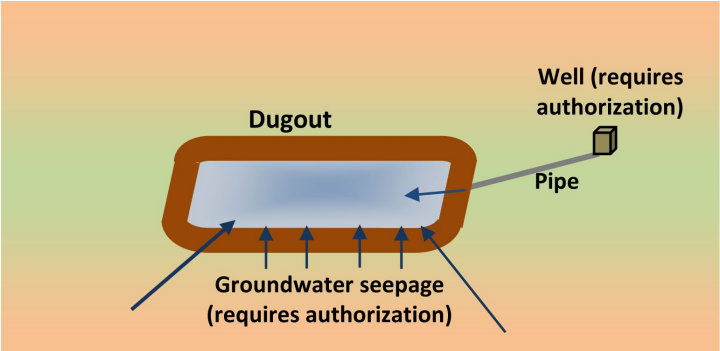

Figure 4.3 Aquifer Supply

Source: "Water Authorization Requirements for Storage Structures" Policy Document, ENV and FLNRORD, September 1, 2017

4.4 Mixed Sources of Water

This may include any combination of groundwater, water from a stream, and precipitation and surface runoff/snowmelt.

Authorization Required: Mixed sources of water could include water from an aquifer or water from a stream. The diversion, storage and use of water from those sources requires an authorization if the water use is not otherwise exempted or allowed by legislation or regulation.

If a dam is proposed to be constructed as part of the works, please consult with the Dam Safety Program.

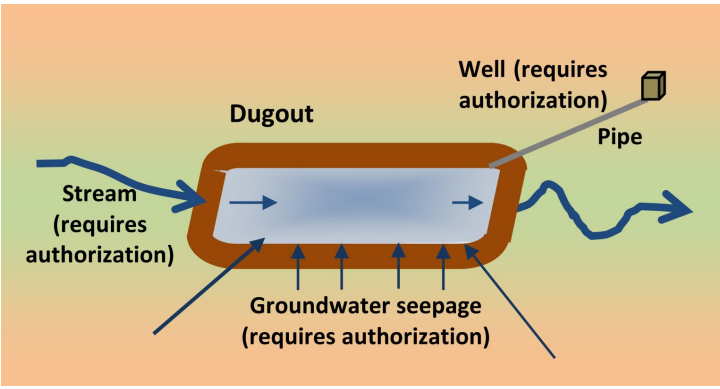

Figure 4.4 Mixed Sources of Water

Source: "Water Authorization Requirements for Storage Structures" Policy Document, ENV and FLNRORD, September 1, 2017

4.5 Overland Flow

This scenario may include precipitation and surface runoff/snowmelt collected from the property into the dugout without a pump.

Authorization Required: None, the *Water Sustainability Act* does not apply. The applicant may be requested by the decision maker to provide assessment and other information that the source of water supply is not from groundwater.

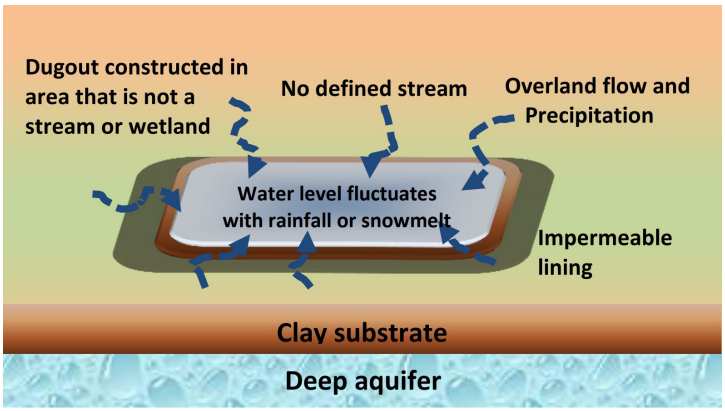

Figure 4.5 Overland Flow
Source: "Water Authorization Requirements for Storage Structures" Policy Document, ENV and FLNRORD, September 1, 2017

5.0 EARTHEN DAMS

The construction of a dugout or reservoir will often require a berm and in some cases a dam. The Dam Safety Regulation provides useful information on determining the rules for different size berms, dams and reservoirs.

There are some other considerations that must be made when contemplating the construction of a dam. The feasibility of the entire project should be evaluated. One key question is: Will the expected benefits from the irrigation be greater than the costs of the storage structure, the conveyance of the water from the reservoir to the fields and the on-farm irrigation system?

A Professional Engineer (P.Eng.) or Qualified Professional (QP) may be required to design, supervise installation, and provide an approved maintenance schedule for the dam. The Dam Safety Officer (DSO) will advise a proponent accordingly.

The following four major elements must be considered for a storage reservoir that has been constructed using a dam:

1. the dam
2. the reservoir
3. the outlet control structure
4. the spillway

These elements must all function properly to ensure that the structure is safe. The following items must be considered for each component.

5.1 Dam

1. Dam should be designed or signed off by a Professional Engineer (P.Eng.) who is legally permitted to practice in B.C.
2. Selection of appropriate fill material is critical.
3. Proximity to material suitable for construction (material should not be removed from the reservoir site if the underlying material will allow seepage).
4. The dam length should be as short as possible (a longer dam is usually more expensive per unit of stored water).
5. Consider the difference in elevation between the dam and the area where the water is to be used. Will gravity supply be sufficient, or will pumping be required?
6. Accessibility to the dam site by construction equipment (road construction may be costly).
7. Consider the risk to transportation corridors, homes and other entities downstream from the dam. Are there steps that can be taken to reduce damage in the event of dam failure?

Figure 5.1 A Sample Dam

5.2 Reservoir

1. Is the reservoir storage volume adequate for existing and future requirements? (see Section 6.0 on Determining Storage Size Requirement).
2. Will the watershed supply enough rainfall or snow melt to meet expected needs?
3. Are the soil conditions adequate to prevent excessive seepage from the bottom and sides of the reservoir?
4. Does the reservoir area need to be cleared?

Figure 5.2 A Sample Reservoir

5.3 Outlet Control Structure

1. The outlet control structure should be installed on the upstream side of the dam so that the outlet pipe is not full of water to prevent freezing during the winter. The outlet control must also be easily accessible.
2. The outlet control pipe should have cutoff collars to prevent seepage traveling through the dam along the pipe.
3. For earthen dams, the pipe should be encased in concrete.

Figure 5.3 A Sample Control Structure

5.4 Spillway

1. A shallow, wider spillway is better than a deep, narrow one. The facility can store more water with a shallow and wider spillway. In addition, the likelihood of erosion caused by the spillway is also reduced.
2. For earthen dams, the spillways should be constructed around the dam in native soil to protect the integrity of the dam. Spillways over the dam should only be used as a last option. They are difficult to build and are costly as they must be made of concrete.

Figure 5.4 A Sample Spillway

3. The spillways must have sufficient capacity to carry flows from major storm events to prevent overtopping of the dam structure. Overtopping can erode the dam structure leading to a complete failure of the facility.
4. A log boom should be placed in the reservoir in front of the spillway to prevent debris from accumulating in the spillway reducing its effectiveness.

6.0 DETERMINING STORAGE SIZE REQUIREMENT

A dugout used for livestock or domestic use can generally be much smaller than one used for irrigation purposes.

The British Columbia Farm Water Dugouts guide provides useful information on sizing a reservoir or dugout for livestock or domestic use. The BC Agriculture Water Calculator also provides proper guidance on annual irrigation requirements as well as stock watering needs. The Calculator shows water requirements on a monthly basis or for the entire irrigation season.

Figure 6.1 A Sample Storage Facility

The following factors need to be considered when determining the amount of stored water required for irrigation:

1. Crop type to be grown
2. Irrigation system type to be used
3. Length of time storage to be required
4. Water source to be supplied to the reservoir
5. Ability of the reservoir to be filled during the growing season

The first step is to determine the length of time that irrigation will be required from the storage facility. Does the storage facility have to supply water for the entire season, or can it be refilled during the summer? Situations where there is a well that produces some flow but not enough to instantaneously provide the required irrigation flow are good candidates for a storage facility. Streams that can provide some flow into the summer and where storage is only required for a few months of operation are also good candidates. Irrigation takes a lot of water and this can be demonstrated by going through a few examples as follows.

6.1 Scenario 1: Area with High Precipitation and Lower Irrigation Demand

Farm and Crop Information:

Location:	Fraser Valley (or Vancouver Island)
Farm Size:	5 acres (or equivalent to 2 hectares)
Crop Grown:	Vegetables on a loam soil
Irrigation System Type:	Drip (A drip system would be the irrigation system of choice as it uses substantially less water and the stored water would then last longer. The BC Agriculture Water Calculator shows a peak flow rate of 20 – 25 US gallons per minute (gpm), but this is calculated based on a sprinkler system. The minimum peak flow for a drip system would be about 15 gpm.)

From BC Agriculture Water Calculator:

Annual Crop Water Required:	4,500 cubic metres (m^3)
Peak Flow Rate Required:	Adjusted to 15 US gallons per minute (gpm) for a drip system during the peak of the season operating 24 hours per day

a). Rainfall and Overland Flow to Fill Storage Facility with No Replenishment from Other Sources During the Growing Season

With the high rainfall in the Fraser Valley (or Vancouver Island), the storage facility may be filled before the irrigation season, especially if overland flow or a drainage system on the farm discharges into the facility in winter months. A storage facility (e.g., dugout or pond) with the following specifications may be possible.

Note: Use conversions of 1 day = 1,440 minutes, and 1 gallon = 0.003785 m^3.

Water Source	Peak Flow Rate	Water Volume	Percent of Farm Area Required
Storage Facility (e.g., dugout or pond)	**15 gpm**	**4,500 m^3**	Volume Stored = **4,500 m^3** Depth of Storage Facility = 2.5 m (on average) Water Surface Area of Storage Facility = 40 m x 45 m = **1,800 m^2** (or **9 %** of farm area)
Total Required	**15 gpm**	**4,500 m^3**	

b). Small Well Replenishes Storage Facility During Growing Season

If there is a small well producing 5 gpm, it can only supply one-third (5 gpm) of the peak flow rate (15 gpm) required for the drip system. Over the entire growing season of approximately 120 days, the well could provide 73% (i.e., 5 gpm x 120 days = 3,300 m^3) of the total crop water requirement (4,500 m^3). The well may have to operate continuously to keep filling the storage facility. The storage facility required is now smaller as it only needs to store sufficient water to augment the irrigation needs during the peak time of the year, approximately 30 days. The small well reduces the pond/dugout size by less than half which may make the capital investment more feasible.

Figure 6.2 A Small Farm Pond

Note: Use conversions of 1 day = 1,440 minutes, and 1 gallon = 0.003785 m^3.

Water Source	Peak Flow Rate	Water Volume	Percent of Farm Area Required
Groundwater	**5 gpm**	= 5 gpm x 30 days = **818 m^3** (or 1/3 of total)	(Not appliable)
Storage Facility (e.g., dugout or pond)	**10 gpm**	= 10 gpm x 30 days = **1,635 m^3** (or 2/3 of total)	Volume Stored = **1,600 m^3** (approximately) Depth of Storage Facility = 2.5 m (on average) Water Surface Area of Storage Facility = 20 m x 32 m = **640 m^2** (about **3.5%** of farm area)
Total Required	**15 gpm**	**2,453 m^3**	

This calculation is simplified as quite often berms may also be required with a dugout which will increase the footprint.

6.2 Scenario 2: Area with Low Precipitation and Higher Irrigation Demand

Farm and Crop Information:

Location:	BC Interior (Walhachin)
Farm Size:	50 acres (or equivalent to 20 hectares)
Crop Grown:	Forage
Irrigation System Type:	Centre pivot (most efficient for forage crops)

From BC Agriculture Water Calculator:

Annual Crop Water Required: 172,000 m^3

Peak Flow Rate Required: 350 gpm during the peak of the season operating 24 hours per day

The farm holds a licence from a stream on the property that can provide 120 gpm during the summer, and therefore supplies about one-third of the required flow rate. Over the entire irrigation season, the stream would be able to supply about 80,000 m^3, almost half of the annual requirement, if it flowed for the full season. In this case, the storage will need to supply 92,000 m^3 to get through the season. The peak flow analysis is more difficult as the peak will likely last longer in the interior than the coastal climate and it is possible that the stream flow will diminish later in the season. It is also likely that the reservoir may not be full going into the growing season as the precipitation over the winter months is much less than the coastal climate. Taking all of this into account, a 100,000 m^3 storage facility is the minimum suggested.

A 100,000 m^3 storage facility would typically have an average depth of 4 m and surface dimensions of 100 m x 250 m. Including berms, the dimensions would be 106 m x 256 m at a minimum, i.e., 2.7 ha surface area or 13.5% of the farm area. The cost of construction, loss of productive land, and determining if the storage facility can be filled during the winter are all considerations that need to be made before investing in such a high capital infrastructure.

Note: Use conversions of 1 day = 1,440 minutes, and 1 gallon = 0.003785 m^3.

Water Source	Peak Flow Rate	Water Volume	Percent of Farm Area Required
Surface Water	**120 gpm**	= 120 gpm x 120 days = **80,000 m^3** (approximately 1/2 of total)	(Not appliable)
Storage Facility (e.g., dugout or pond)	**230 gpm**	**100,000 m^3** (minimum required)	Depth of Storage Facility = 4 m (on average) Surface Area of Storage Facility = 106 m x 256 m (including berms) = **27,136 m^2** (or 2.7 ha or approximately **13.5%** of farm area) The surface area assumes the actual surface dimensions to be 100 m x 250 m, and includes bank widths around the facility.
Total Required	**350 gpm**	**180,000 m^3**	

7.0 CONCLUSION

Consider the following when contemplating storage:

1. Will it be filled from winter runoff or some other sources before the irrigation season is underway?
2. Consider the annual requirement and peak flow requirements of your irrigation system. Storages can be very useful to supply the peak flow of the irrigation system if the water source is not able to.
3. Dug storages will likely be smaller and store less water than a reservoir behind a dam. If the storage is filled by diverting from a stream or groundwater, a storage licence is required and a use licence must be applied for if the facility is used for non-domestic use.
4. Can the storage be refilled while in use from a well or other sources?

8.0 REFERENCE INFORMATION

8.1 Further information on dugouts can be found at the following links:

- Water Authorization Requirements for Dugout Structures developed by BC Ministry of Environment and Climate Change Strategy (ENV), and BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) and effective on September 1, 2017.
- British Columbia Farm Water Dugouts Guide developed by BC Ministry of Agriculture in October 2013.

8.2 Additional information regarding dams can be found in the Dam Safety Regulation, 2016, or contact the Dam Safety Program staff at dam.safety@gov.bc.ca.

8.3 Contact FrontCounter BC to learn about your options or get help with your water licensing application.
Toll Free: 1-877-855-3222 or Email: FrontCounterBC@gov.bc.ca

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