15 Data Gaps, Science and Information Needs

This section identifies data gaps, science and information needs that need to be investigated during the term of the current plan. These investigations will provide background data on portions of the river system for which information is presently lacking or inadequate, and will provide the basis for an adaptive management approach to resolution of specific issues (e.g., Moon River walleye spawning/flow duration and fluctuations). Results from these investigations will assist in determining whether future operating plan changes are required and/or warranted. The data gaps, science and information needs, are summarized in Table 15.1 and discussed in additional detail in the following sections.

15.1 Riparian Zone Habitat

Higher spring water levels are anticipated to provide an improvement in riparian zone habitat on a number of lakes within the river system (i.e., McCraney Lake, Fox Lake, Mary Lake, Tea Lake, Matthias Reservoir, Lake Muskoka). However, the consensus among Planning Team participants, taking into account input from MNR Science personnel, was that there is no standard protocol available at this time to evaluate whether a change in spring water levels will result in a detectable (i.e., statistically significant) change in riparian habitat. Over the course of the plan, an appropriate sampling framework will be developed to address this deficiency. Guidance and assistance will be sought from MNR's Wetland Specialist (Mr. B. Potter), the Muskoka Watershed Council, and appropriate federal and provincial agencies and academic institutions (i.e., Trent University, etc) in the development of this methodology. The MNR and OPGC will take the lead in developing the prescribed methodology within a year of plan approval. Once developed, sampling will be implemented within 2 years.

15.2 Moon River Walleye Spawning Habitat and Spawning Activity

As discussed in Section 6, the Moon River represents one of the significant fisheries issues identified through the water management planning process in the Muskoka watershed. To complement past work, further investigations are proposed to more clearly establish the quantity and quality of spawning habitat below Moon Falls (See Figure 15.1) at various Moon River flows. The information gathered in this study will allow MNR and OPG to more precisely

relate the quantity of spawning habitat available to walleye with the different flow rates that are present within the river system. From this work, discussions with OPG regarding how different flow rates impact available spawning substrate for walleye below Moon Falls will occur. Future amendments to the Plan are anticipated as a result of these discussions and will likely include changes to flow management down the Moon River and/or engineered solutions. It is anticipated that the work to be conducted will form the basis of an adaptive management approach which will attempt to improve walleye spawning success and numbers below Moon Falls, and ultimately improve recruitment to the Georgian Bay fishery.

15.2.1 Spawning Habitat Investigations

Spring 2005

A rating curve within the Dillon (1983) report provided a general correlation between flow and water level for the pool immediately below the falls (Lower Pool) and the area beyond the Second Narrows (outlet from Lower Pool). Field investigations during the spring 2005 freshet will provide a better correlation of river flow with the quantity and quality of spawning habitat, and specifically of the areas inundated in the vicinity of Second Narrows. Investigations will commence when water temperatures reach 6^{o} C and/or when notified by a local observer (B. McRobb) that walleye are staging in the area. Multiple transects will be established across the river below Moon Falls with sampling locations along those transects. Water level (compared to a standard benchmark) and wetted perimeter (the width of the wetted river channel) will be obtained at flow increments of approximately 10 m^3/s (flow information to be provided by OPG). Transects will be spaced 10 m apart to a sufficient distance downstream to capture all available spawning habitat (approximately 400 m). Physical and biological data (flow velocity and vector presence/absence of spawning fish and/or eggs, etc) will be gathered along each transect as water levels recede from the highest level experienced during the freshet. All sampling locations will be determined with differentially corrected GPS.

Summer 2005

While observations of river bottom substrate characteristics will be undertaken as available during the spring survey, it is likely that high water levels and flows will limit data collection along the lower portion (i.e., deepest

part) of each transect. River channel substrate characteristics will be determined at 5-m intervals along each sampling transect (i.e., those surveyed during the spring) in August under low flow conditions according to the classification scheme developed by Northeast Science and Information of OMNR (see Table 15.2). All data collection sites will be located with Differential GPS, and will be correlated with data collected during the spring sampling period.

The collection of geographically referenced spawning substrate data will allow the amount of suitable walleye spawning habitat to be correlated with river flows through time. This information will result in the production of a detailed map, which correlates spawning habitat with water level and river flow. Further discussions can then occur between MNR and OPG regarding suitable flows for spawning walleye and walleye spawning habitat below Moon Falls and what flow management regime will be in place for the future.

15.2.2 Spawning Activity and Populations

In concert with flow/habitat data collection, further investigations of spawning activity and numbers are proposed to determine the size of the walleye spawning population using the spawning area below Moon Falls. In addition the area below Moon Falls has been identified as an historically significant lake sturgeon spawning area. As such, sturgeon assessment is planned, to investigate the presence of sturgeon below Moon Falls. Opportunities to investigate solutions proposed in previous studies will also be assessed. Programs to be undertaken include:

- consolidation of all available biological and physical data, and preparation of a background information document which summarized present information concerning the Moon River walleye stocks and their issues

- field investigations of walleye spawning activity and numbers, including locations of spawning walleye and areas of egg deposition, in 2005 and at 5-yr intervals thereafter to monitor progress toward a larger walleye population

- investigate existing engineering options (Dillon report and similar alternatives) and test potential solutions to stranding and/or downstream displacement of eggs (i.e., fencing to limit access to higher elevation spawning sites, addition of coarse substrate to improve egg retention,

in-channel weir to increase spawning habitat area and/or limit access to unfavorable spawning areas, etc) on collection of flow/habitat relational data

– sturgeon short set gillnetting in 2005 to investigate the presence of sturgeon below Moon Falls.

Information from these studies will be used in an adaptive management approach to develop a long-term solution to improved walleye and sturgeon spawning success at the Moon Falls site, and ultimately improved recruitment to the Georgian Bay fishery. This may entail amendments to the Plan. MNR and OPG will work together to develop and undertake the above-noted programs.

15.3 Summer Riverine Habitat

Higher base flow in river reaches is anticipated to provide improvements to aquatic and riparian habitat within those river segments. Presently, the MOE is using the sampling method described in the Ontario Benthos Biomonitoring Network Protocol Manual to evaluate invertebrate population change over time in small wadeable streams. These standard protocols will be used to collect background information at two locations within the river system (McCraney Creek, Tasso Creek), as a potential prelude to the adoption of these procedures to evaluate flow-related changes at other river system sites.

However, standard protocols are not available for larger, deeper stream reaches that would provide a similar level of statistical confidence. Over the course of the plan, appropriate methodologies will be developed to address this deficiency. Guidance and assistance will be sought from MNR's Wetland Specialist (Mr. B. Potter), the Muskoka Watershed Council, and appropriate federal and provincial agencies and academic institutions (i.e., Trent University, etc) in the development of this methodology. The MNR will take the lead in developing the prescribed technique within a year of Plan approval. Sampling will be initiated no later than 2 years after development and/or selection of the appropriate technique.

15.4 Moon River Sturgeon

The area below Moon Falls has been identified as an historically significant lake sturgeon spawning area. An assessment is required to investigate the current use

of and/or abundance of spawning sturgeon in this area. This will be undertaken as and when funding becomes available.

15.5 Operational Model Using Flood Forecast Information

High water levels on the river system and in particular, on the Bala Reach, are difficult to control due to limited storage availability in upstream lakes. Utilization of management tools (i.e., operational model using flood forecast information) may reduce the severity of short term, moderate flow events. MNR will pursue funding opportunities to develop and implement a model for the Muskoka River.

Table 15.1
Data Gaps, Science and Information Needs

No.	Objective	Data Gap	Who	How	Section
Ecological					
1	Riparian Zone Habitat - achieve high spring water levels for a longer duration that would inundate floodplains and a portion of the riparian zone	Sampling technique and implementation within riparian zone	MNR	Develop a sampling technique within one year of plan approval; sampling will be initiated no later than 2 years after development and/or selection of the appropriate technique	15.1
2	Moon River Walleye Spawning Habitat and Spawning Activity	Spawning Habitat Information	MNR and OPG	Spring 2005 water level and wetted perimeter study; Summer 2005 collection of geographically referenced spawning substrate data; correlation of substrate data with water flows during the spawning period	15.2.1
		Spawning Activity and Population Information	MNR and OPG	Consolidation of biological and physical data; field investigations of walleye spawning activity and numbers in 2005 and at 5-yr intervals thereafter; investigate potential engineering options; develop an adaptive management approach to improve walleye and sturgeon spawning success at the Moon Falls spawning site	15.2.2

Table 15.1
Data Gaps, Science and Information Needs

No.	Objective	Data Gap	Who	How	Section
3	Summer Riverine Habitat	Standard methodology for larger, deeper river reaches	MNR	Develop a prescribed sampling technique within one year of plan approval and initiate sampling at two locations (McCraney Creek, Tasso Creek) no later than 2 years after development and/or selection of the appropriate technique; develop over time a standard methodology for larger, deeper stream reaches in partnership with other agencies and academic institutions.	15.3
4	Moon River Sturgeon Spawning Habitat and Spawning Activity	Current use and/or abundance of spawning sturgeon	MNR and OPG	Carry out an assessment of current use and/or abundance below Moon Falls as funding is available; develop an adaptive management approach to improve sturgeon spawning success at the Moon Falls spawning site	15.4
Engineering					
1	Operational Model using Flood Forecast Information to reduce the severity of impacts of short-term, moderate events	Operational model using flood forecast information	MNR and other partners	Develop an operational model using flood forecast information and implement the model for the Muskoka River as funding is available	15.5

Note:
Some of the above actions, to some extent, are already being done. Other actions involve the need to develop partnerships with other organizations, and other actions, requiring financial resources and staff time from MNR, will be addressed as resources become available to achieve them.

Table 15.2
Particle Size Classification of Bottom Substrate
(Rosgen, 1996)

Particle Description	Size Range (mm)
Silt/Clay	<.062
Very Fine	0.062 – 0.125
Sand – Very Fine	0.125 – 0.25
Medium	0.25 – 0.50
Coarse	0.50 – 1.0
Very Coarse	1.0 – 2.0
Gravel – Very Fine	2.0 – 4.0
Fine	4.0 – 6.0
Fine	6.0 – 8.0
Medium	8.0 – 12.0
Medium	12.0 – 16.0
Coarse	16.0 - 24.0
Coarse	24.0 – 32.0
Very Coarse	32.0 – 48.0
Very Coarse	48.0 – 64.0
Cobble – Small	64 – 96
Small	96 – 128
Large	128 – 192
Large	192 – 256
Boulder – Small	256 – 384
Small	384 – 512
Medium	512 – 1024
Large – Very Large	1024 – 4096
Bedrock	

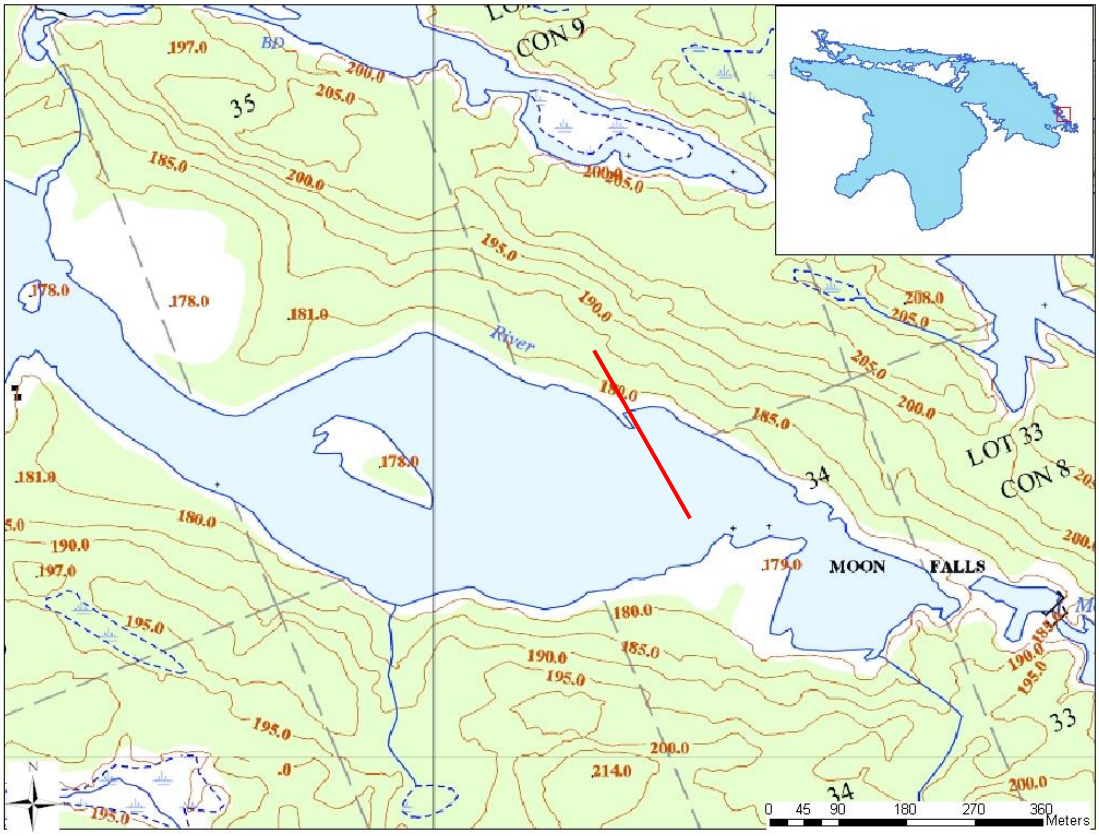


Figure 15.1
Site of Moon River Walleye Habitat Investigations