EMAB

Fish and Fish Habitat Monitoring Technical Workshop

February 20 - 21, 2002
EMAB Board Room, Yellowknife

WORKSHOP SUMMARY NOTES

Prepared for:

Environmental Monitoring Advisory Board
Yellowknife, NT

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Workshop Summary – Day One

Opening Prayer (August Enzo, elder)

Welcome and Opening Remarks (Bob Turner, Chair of EMAB)

B. Turner welcomed the participants and stated that EMAB is committed to providing an integrated and co-operative approach to the environmental management of the Diavik Diamonds Project. This workshop is a contribution to the EMAB commitment.

Workshop Objectives (facilitator)

Workshop Objectives:

1. To review and discuss the state of knowledge pertaining to the Fisheries in Lac de Gras and the Diavik Diamond Mines project area as it relates to other projects in the area, the Diavik Comprehensive Study Report, the Environmental Agreement and regulatory licensing of the Diavik Diamond Mines Project;

2. To review and discuss the requirements of the water license and Fisheries Authorization including the management and monitoring plans, the habitat compensation strategy , Fish Salvage reports, the Slimy Sculpin Baseline Metals Study, and the Lake Trout Habitat Utilization Study;

3. To discuss upcoming submissions on fish palatability;

4. To recommend, as required, changes to the monitoring strategy to reflect revised impact predictions and to strengthen aboriginal community involvement in the full range of monitoring activities.

Workshop Summary Organization and Presentation

The workshop summary is organized and presented in the actual sequence in which the presentations and discussions occurred. Formal presentations are cross-referenced in the appendices and key discussion points are identified. Appendices C, D, E, F and G contain the materials actually covered during the presentations.

The Working Agenda is attached as Appendix A and the list of participants is included in Appendix B.

Agenda Item 1: Review of the State of Knowledge pertaining to Fish and Fish Habitat in Lac de Gras (Presentation, Peter McCart, Aquatic Environments Limited)

(Presentation – see Appendix C)

It was noted by some EMA Board members that the absence of DDMI and DFO is a concern. The Executive Director noted that the first part of the agenda is intended as an opportunity to develop a common understanding of fish and fish habitat.

P. McCart:

- Fish species in the Lac de Gras are "generalist" and have adapted to the harsh environments.
- There are five species related to the salmon family. They are specialized to feed on zooplankton and have developed long gill rakers that are able to filtrate the water. One example is the Lake Cisco. In comparison, the Lake Whitefish, e.g., has fewer gills and is less specialized to feed on zooplankton. The Diavik project may lead to an increase in zoo plankton in Lac de Gras; some species will suffer; others are expected to benefit.
- There were concerns raised during the Diavik hearings regarding the impacts of blasting explosions on eggs, especially fall spawners. According to DDMI, there is a zone of potential damage to larvae. There are two concerns. The first is that fish eggs react to any mechanical shock, and are particularly sensitive during the stage prior to having developed their eyes. The second concern is that layers of sediment upon eggs will inhibit the necessary level of oxygen needed for the eggs to survive and develop. As the embryo grows, sensitivity to oxygen access increases. The lack of oxygen will contribute to premature hatching, lessening their possibility for survival.
- P. McCart noted that DDMI has identified the possibility of cadmium leachate from the raw granite rocks that will be placed on the outside of the dyke. Cadmium *can* be toxic at low levels. It has been found that this is not problematic when fish are at the egg stage, but that the hatched out fish may be more sensitive. This is also the stage when the larvae sit in the spaces in the rocks.
- The water of Lac de Gras is very dilute (clear water with low levels of salinity, leading to relatively low levels of production). This causes osmotic stress in fish, by which the fish absorb excess water, bloat and die. When water is pumped from the pit into the lake, there will be an increase in dissolved solids concentrations, and an increase in sodium, chloride, manganese, etc. It is predicted that the level of salinity will be increased by 6-7 times. This may be beneficial to some fish, as less energy will be required to counter osmotic stress and as the salinity levels of the water will approach that of the salinity levels of the fish themselves. Some of the larger species are better adapted to low salinity levels than others, giving them a current advantage. It is a possibility - a hypothesis only - that, with increased salinity, Lake Whitefish, for example, will gain a more favourable environment.

Discussion:

- A question was raised as to whether the proportions of the various fish species to each other are known. P. McCart responded that there is an issue related to the sampling methods used. With the use of gillnets, for example, it is easier to catch Lake Trout than Burbot. Without the appropriate sampling method(s), we cannot know precisely the proportions of fish species in the Lac de Gras.
- A question was asked about the role of the Slimy Sculpin in the monitoring strategy. P. McCart replied that the Slimy Sculpin is a relatively stable species (i.e. not highly migratory), making it appropriate for measuring changes and impacts. DDMI has used the Slimy Sculpin for monitoring and measuring changes in metals levels.
- It was asked if any of the species of Lac de Gras are considered endangered. P. McCart replied that none of them are.

- It was asked whether different species have different levels of sensitivity in terms of impacts of explosives and access to oxygen (due to sediment). P. McCart stated that a substantial amount of work has been conducted on the impacts of seismic work on fish, but that not enough is known about impacts of low velocity explosions. This observation applies to fish habitat in general and not just Lac de Gras.
- A question was raised as to whether certain species would gravitate towards the discharge areas, and whether this would alter the distribution of fish. P. McCart replied that, according to the DDMI study, Lake Whitefish tended to be attracted to areas of discharge, as the bottom was stirred up, making food sources available. In the Lac de Gras, no river feeds into the nutrient levels of the lake, in particular in the east end of the lake. As such, the east end of the lake has a lower level of production that the west end.
- A question was asked about the ability of fish to adapt to the changes in nutrient levels (reducing) that are expected to occur when the mine closes. P. McCart suggested that fish species will likely re-adapt, as they would to any significant and sustained change in their environment.
- It was asked if the changes in salinity levels will also impact on oxygen levels. P. McCart suggested that isolated pockets in the lake may have a slight decline in oxygen concentration. This is an issue that should be considered in the monitoring program.
- It was asked whether the predicted increase in production due to increased nutrient levels would be a "healthy increase in production".
- A question was asked with regards to the compensation plan, where is discussed that changes in the levels of primary producers is considered an indicator. Why is this important to DDMI to monitor? P. McCart explained that the algae known as "dinobryon" are very well adapted to very low levels of phosphorous (as found in unproductive lakes such as Lac de Gras). Increases in the phosphorous levels may cause the disappearance of dinobryon. The impacts would be noted in dinobryon before changes would be detected in the higher levels of the food chain.
- K.Lauten commented that the model used for fish and fish habitat monitoring is flawed, as it does not consider the inflow into the lake and the potential for increased carbon input as a result of the removal of tundra, rocks, etc.

Agenda Item 2: Review of the State of Knowledge Pertaining to Fish and Fish Habitat in Lac de Gras: What is Known about the Lac the Gras Area and Why is it Important?
(Presentation, Gord McDonald, DDMI)

(PowerPoint Presentation – see Appendix D)

G. McDonald:

- DDMI is sensitive to potential issues of over-sampling. The fact that sampling in itself may have impacts must be taken into consideration. DDMI attempts to obtain adequate sample sizes but are aware of the risks of over-sampling.
- A limnology study has recently been completed (a compilation of past studies).
- Lac de Sauvage was originally intended as a reference study. It is now affected by BHP's Misery Pit, and can no longer be used as a comparison site.
- The focus of the monitoring studies has been on four species: Lake Trout, Cisco, Round Whitefish, and Arctic Grayling.
- Regarding fish habitat monitoring, the focus is on the shorelines (stretching 794 km, dominated by boulders), the uneven lake bottom, and the importance of the shoals around the East area of the Lac de Gras.
- Regarding impacts on inland lakes, 33 lakes were surveyed. It was found that all but one (named E10) are avoided by the project.
- Importance of fish in the Lac de Gras area relates to i) traditional and sports fishing; ii) the key position in the aquatic food chain, and iii) the linkage between the aquatic and the terrestrial ecosystem.

Discussion:

- The question was asked as to how DDMI determines the relative important of various key species for the monitoring plan. G. McDonald replied that the importance is determined by three factors: i) the abundance of the species, ii) the utility for humans, and iii) the sensitivity to impacts.
- A question was asked if results of fish-out studies were included in the AEMP. G.McDonald replied that nothing new was discovered though the fish-out studies and that different sampling techniques were used, one of which proved more effective for sampling Lake Trout.
- A question was asked if differences were detected between the baseline studies conducted and the results of the fish-out studies. D. McDonald replied that more species and a greater abundance of fish was detected through the fish-out studies. He added that the DFO needs to determine how to use the baseline data collected.
- It was asked how traditional knowledge was used in the fish and fish habitat baseline studies. G. McDonald replied that, relative to the caribou studies, traditional knowledge comes less into the studies on fish and fish habitat studies. However, communities have worked with DDMI in this regard. A Delphi method was used to define what fish species use what areas of the lake. Not a lot of feedback was received from the communities, however. The survey was conducted in addition to community consultations.

Agenda Item 2: Review of the State of Knowledge Pertaining to Fish and Fish Habitat in Lac de Gras: The Importance of the Area to the Communities

- The facilitator asked participants representing communities to share their views on the significance of the Lac de Gras area, in terms of fish and fish habitat.

Discussion:

- In the past, if there was not enough caribou, people in the communities lived off fish. In addition, fish was also important to feed dog teams.
- Our region is our bank of resources. If anything is taken away from one area, it needs to be compensated. If an area is currently not used extensively, it should not be precluded from possible use in the future. We must keep this resource for our children.
- The area was more important in the past, as we used it for trapping. People depended on caribou and fish.
- The quality of water affects our drinking water. The Lac de Gras was used as traditional fishing waters for char, whitefish, trout and grayling. It was also used by other animals, such as wolves and wolverines. The greatest importance of the lake is as a water source.
- A comment was made that the Coppermine river is highly regarded for recreational use and its heritage status. The people of Kitikmeot depend on the Coppermine River for a wide range of important factors.

Agenda Item 2: Review of the State of Knowledge Pertaining to Fish and Fish Habitat in Lac de Gras: Fish and Fish Habitat Issues Raised in the Diavik Comprehensive Study and How These Were Addressed (Presentation, Julie Dahl, DFO)

(PowerPoint Presentation – see Appendix E)

J. Dahl:

- Three main issues were raised:
  1) Physical impacts to habitat, including losses due to dyke placement and the mine infrastructure;

2) Sediment deposition. It is estimated that 2 – 5% of spawning and/or rearing habitat will be lost. Impacts on eggs and benthos were considered. A silt curtain has been installed to mitigate these impacts.
3) Chemical/ Water Quality impacts. These relate to metals leached from dikes (such as elevated cadmium levels, and bioaccumulation in benthos and fish); mine water discharge; surface run-off; and nutrient enrichment.

- Potential impacts to fish were considered in terms of fish-outs and fish salvage; fish palatability and texture; impacts of suspended sediment; recreational angling; explosives; and metal concentrations.

Discussion:

- It was asked if impacts of vibrations of heavy traffic on the winter road were taken into consideration. J.Dahl responded that they were not considered as the decibel levels generated by the traffic would not be high enough to impact the fish. It was recommended by an EMAB member that impacts of sediment disturbance related otthe winter road should be considered.
- A question was asked as to how impacts of blasting are mitigated. J. Dahl responded that the blasting is sequenced, generating a series of smaller charges rather than one large explosion. Sonic waves may also be used to deter fish from spawning in the dyke areas.
- It was asked if the issue of regulating temperatures is dealt with. J. Dahl responded that this issue has been noted, in terms of possible attraction by fish to the discharge area. There will not be a big temperature difference.
- It was asked that an explanation of what mine water is be provided. J. Dahl explained that mine water is mostly ground water that has come into contact with the mine and which has passed through the treatment plant. All run-off will be contained. The quality of the water must be tested before it is let out into the lake.
- A suggestion was made that the prevalence of disease in fish of Lac de Gras should be continually monitored and compared against the baseline measurements on fish disease gathered by DDMI.
- It was asked if baseline data is available on metal concentrations in fry. J. Dahl responded that such data is only available in juvenile and adult fish. The biggest source of metal intake is through the diet, why it is more relevant to look at older fish for the purpose of measuring metal levels.
- J. Dahl commented that there is a requirement to measure water quality at the dyke site, including cadmium levels. This is now done on a site specific comparison basis. Some threshold levels can be gained, however, from other sites to which the measurements are being compared.
- A question was asked as to whether there are issues related to oxygen concentrations that should be considered. J. Dahl responded that there is a natural decline in oxygen concentrations but that studies have not found an accelerating level of decline. The increase in phosphorous levels will not have any impacts on the levels of oxygen.
- It was asked how BHP has dealt with the issue of measuring oxygen levels. J. Dahl stated that BHP is required to monitor levels of oxygen in the Kodiak Lake during sewage discharge. Air raiders are in place each winter, which has kept oxygen levels at an adequate level during the winters.
- A discussion occurred regarding the respective roles of industry and government in carrying out monitoring studies. J. Dahl stated that DFO currently does not carry out any studies on the lake. It is the responsibility of DDMI to verify impact predictions. The monitoring results are used for adaptive management of the fish and fish habitat. The idea of a possible need for independently conducted monitoring studies was put forth.
- It was requested that a definition of “sustainable yield” be provided and an explanation as to why it is a problematic concept. J. Dahl explained that “sustainable yield” refers to the level of fishing pressure that a lake can tolerate before the fish population declines.

There is some disagreement on what measurements should be used to assess "sustainable yield".

- A question was raised as to whether protocols for the collection of data on fish is established. J. Dahl responded that the use of basic approaches are fairly consistent but that there is a vast range of approaches to methods for gathering detailed measurements. Different nets may be used, and there are different ways to use the nets for sampling. DFO is currently moving towards making protocols more consistent.
- It was asked if peer reviews are conducted on the monitoring studies. G. McDonald replied that DDMI submits their proposed methods to DFO prior to conducting monitoring studies. Peer reviews are sometimes carried out within the consultancy industry.

Agenda Item 3: Review of the Regulatory Requirements: Management and Monitoring Plans (Presentation, Gord McDonald, DDMI)

(PowerPoint Presentation – see Appendix F)

- In response to the water license requirements, DDMI carries out three specific monitoring programs: the Surveillance Network Program, measuring the quality of water off site; the Aquatic Effects Monitoring Program, measuring the effects of water after it is released; and the Special Effects Monitoring Program.

Discussion:

- A discussion took place regarding the fact that Lac de Sauvage can no longer serve as a reference lake, as it is a receiving lake from BHP. It was asked how this issue is dealt with. G. McDonald replied that no other control lake has been identified and that there are no intentions of obtaining one. The reason is two-fold. First, there is no way to protect any chosen control lake from development, as happened to Lac de Sauvage. Second, the emphasis is now on comparing pre-development and post-development conditions by measuring changes near the site and far from the site. It was added that there has been substantial previous discussions on this issue with the Diavik Technical Committee.
- A question was asked as to whether DDMI and BHP collaborate on fish monitoring studies. G. McDonald replied that there is not much cooperation since the issues are not overlapping. There is more collaboration on water quality issues.

Agenda Item 3: Review of the Regulatory Requirements: Water License (verbal presentation, Karl Lauten, MVLWB and Sevn Bohnet, DIAND)

K.Lauten:

- The current water license has been inherited. The rationales are not always clear.
- Compliance is required for numerical and subjective limits (end-of-pipe) of emissions. This has little to do with aquatic effects in the long term.
- The information provided to the MVLWB is relatively new. The issue of phosphorous, for example, is not legislated for other mines. There is more knowledge about Diavik than BHP, as the requirements have evolved.
- No limits or thresholds have been identified for triggering regulatory action.
- The MVLWB can make recommendations and/or amendments to the Fish Authorization in the public interest.
- The MVRMA requires public consultation. This requirement is still evolving.
- Regarding the development of the current water license: in the past, the NWT Water Board acted as the permitting agency. Assessment of the project was conducted under the Canadian Environmental Assessment Act (CEAA), resulting in the Diavik Comprehensive Study Report. During the completion of the Comprehensive Study

report, numerous issues were identified and addressed. Upon public review and revisions, public hearings before the NWT Water Board were held in December 1999. It was then determined that a technical advisory group be formed, with the role to recommend conditions for the water license that are now in place.

Sevn Bohnet:

- The various sections of the Water License were reviewed, with specific reference to monitoring and reporting
- Noted that there is significant overlap between the Water License and the Aquatic Effects Monitoring Plan: the latter fulfils the requirements of the Water License. Impacts on fish are dealt with under the Fisheries Authorization.

Discussion:

- A concern was raised that there appears to be a lack in clarity in the roles and responsibilities of the MVLWB, DFO and DIAND with regards to the reporting of fish and fish habitat monitoring results and enforcement of monitoring compliance. Concern was also expressed with the absence of inspection and compliance capacity in DIAND's South Mackenzie District operations.
- K. Lauten stated that the MVLWB does not have a body to consult in terms of inspection. The Water License is too prescriptive, not allowing inspectors' work. In this sense, the MVLWB is powerless in terms of dealing with issues of non-compliance. DIAND is equally helpless, due to the lack of funding and resources. Regarding compliance with the Water Licence, section 37 provides an avenue for enforcement if conditions of the License are not complied with. However, section 35 provides a caveat in that an impact has to be demonstrated. The MVLWB can set more restrictive limits (to e.g. effluents) than allowed for by the DFO.
- A concerns was raised with regards to who has the responsibility of reporting on monitoring study results/compliance issues. – the MVLWB or the DFO? G. McDonald replied that the DDMI was asked by the technical advisory committee to synchronize all submissions to the MVLWB to put on the public registry. An approved Aquatic Effects Monitoring Program report is now available. K. Lauten added that the MVLWB does not have a database set up at the present time.
- It was asked whether the Aquatic Effects Monitoring Plan state threshold levels or triggers for when mitigation measures must be taken, how these should be enforced. J. Dahl responded that these are included in the existing authorization.

Workshop Summary – Day Two

Review of Agenda for Day Two (facilitator)

Agenda Item 3: Review of the Regulatory Requirements: Fisheries Act and Authorization and the "No Net Loss principle" (Presentation, Marc Lange, DFO)

(PowerPoint Presentation – see Appendix G)

M. Lange:

- Noted that the No Net Loss principle is not a policy, but a guiding principle used by DFO to review EA submissions with regards to impacts on fish and fish habitat issues. The principle requires that an increase in net gain be achieved. In inland lakes, the increase in net gain must be at least 1.5 times the pre-project production level.
- Regarding habitat compensation, a hierarchy of actions (ranging from most preferred to least preferred action) determines the compensation action that should be implemented for a particular instance of habitat loss. The most preferred action is that of developing similar habitat near HADD (Harmfully Alter, Destruct or Destroy) within the ecological unit.

Discussion:

- It was asked whether the Fisheries Authorization can be altered, on the basis of "adaptive management". M. Lange replied that this could be done if the habitat compensation measures do not result in the production of fish.
- Clarification was sought on how information is gathered towards implementation of adaptive management. M. Lange replied that this information comes from the Monitoring Program generated by DDMI (and developed in consultation with DFO). The proponent pays for and is responsible for carrying out the monitoring program activities.
- A question was asked as to whether indirect effects of compensation have been considered by DFO, such as potential negative effects of population increases due to industry expansion, leading to increased pressures on fish resources.
- Clarifcation was sought on how habitat units (HU) are calculated, and for what species these are calculated. G. McDonald responded that habitat units are calculated for eight species, for each life stage, and for each habitat type. Species are weighted differently according to different levels of importance. The level of importance is determined primarily by the relative abundance of the species and utility to humans. The HU is determined by DDMI and reviewed by the DFO.
- A question was raised as to who determines suitability of an area. M. Lange replied that this is determined by the DDMI, consultants, and reviewed by DFO scientists. G. McDonald added that the Delphi survey (as discussed above) was sent to regulators, scientists and communities for feedback. 14 responses were received, 75% of which were from DFO.
- A comment was made regarding the No Net Loss principle. It was stated that the policy should allow for compensation in areas not directly in the vicinity of the Lac de Gras area. Compensation away from the site would be useful in fulfilling the compensation plan. The project should ultimately result in social and economic benefits to the residents of the NWT, through increased productivity of fish resources.
- A question was asked as to what the No Net Loss principle will do to ensure the availability of fish for human use at the end of the project. J. Dahl responded that DFO must report on how much habitat is lost and replaced. Fixing the habitat does not necessarily increase the number of fish. There is a need to determine if the bottleneck is over-fishing/use or the loss of habitat.

- G. McDonald commented that the No Net Loss principle has not changed since 1996. DDMI welcomes the input from EMAB on how to move forward, in terms of determining habitat suitability, design of the engineering, etc. An EMAB member responded that, from an Aboriginal perspective, we want to raise concerns about the need for flexibility of the No Net Loss principle. We will continue to raise this concern.
- In response to the concerns raised regarding the No Net Loss principle, G. McDonald raised the question as to whether it is worthwhile to seek input on the workplan, if the compensation plan is not yet approved by the communities.
- A question was raised as to the possibility of introduction of new fish species in other lakes. G. McDonald replied that the current compensation plan is to construct inland lakes and let the fish come into these as they will, not stocking them. This is in response to concerns that were raised in the communities.
- A discussion took place regarding the of involvement of the communities. Concerns were expressed that the communities have not been involved to the extent that is legislatively required, and that traditional ecological knowledge has not been mentioned in the studies. It was expressed that the use of surveys (such as the Delphi survey referred to earlier in the discussion) is often not an appropriate method for gathering community input. It was also pointed out that consulting with EMAB members does not substitute for consulting with the communities. Linkages between EMAB and communities need to be strengthened. G. McDonald replied that DDMI would appreciate input from EMAB on how to proceed towards improved community involvement, and towards incorporating traditional ecological knowledge.
- G. McDonald suggested that DDMI has been constrained by the No Net Loss principle in how the compensation plan needed to be developed and the extent by which community concerns have been incorporated. During community consultations, DDMI spoke about the compensation plan, and heard the kinds of concerns expressed earlier in the discussion (regarding compensation in areas outside of the site area). An EMAB member responded that, while DDMI is constrained by the law, it should not be limited by it. The requirements by various used groups have not been adequately addressed.

Agenda Item 4: Review and Discussion of Submissions: Conceptual Design and Compensation Workplans for Fish Habitat Compensation Program (Presentation, Gord McDonald, DDMI)

G. McDonald:

- As part of the compensation plan, DDMI is proposing to create fish habitat similar to the most common habitat type in the Lac de Gras on the “bench area” between the pit and the dyke. The purpose to try to improve productivity in the lake as a whole. According to the Rock Management plan, only Type 1 rock (granite) can be used for this activity. Testing for cadmium leachate will be carried out.

Discussion:

- A suggestion was made that the bottom of the shallow areas of the created habitat be constructed with dark material so as to lessen bird predation of fish.
- It was asked if reefs will be created at the outside of the dyke to facilitate schools of fish coming through. G. McDonald replied that, to begin, the material that is readily available will be used. There is a question of whether the boulders will be too large. DDMI will begin to create the habitat as the dyke is constructed and then modify according to how fish eggs and are developing and hatching.
- A question was asked as to whether geotechnical studies have been conducted on the impacts of the loading on the shelf/bench. Will the loading create instability in the pit work? G. McDonald responded that these kinds of studies have been conducted. The engineers will provide a “reality check” as to what is possible to construct in this regard.

G. McDonald:

- Three inland lakes (named M1, M2 and M3) that are connected to Lac de Gras have been selected for the compensation plan. However, the connections between these lakes are not adequate. The Fisheries Authorization requires improved connection between the three lakes so that fish can utilize one lake, yet increase productivity as a whole, as compensation for fish habitat lost to the project.

Discussion:

- A concern was raised that, if no over wintering habitat is created in the M2 and M3 lakes, fish may be jeopardized, as they may not be able to return to lake M1. There is a need for a mechanism to ensure that fish can return at any time of the season.
- Concerns were raised that creating new habitats that previously did not exist may cause more problems than it may solve. It was asked if physical alterations of the Lac de Gras were considered for the compensation plan, rather than the M1, M2 and M3 inland lakes option. G. McDonald replied that the "like for like" policy by the DFO did not allow for such an option. The selection of the M1, M2 and M3 lakes is based on needing to stay in the vicinity of the project.
- Concern was expressed with the possibility of the M1, M2 and M3 lakes compensation plan not working out. What would then be done, and by whom? J. Dahl responded that it needs to be recognized that projects cannot go on in perpetuity, and that there needs to be closure for the proponent. There are very few examples of successful compensation measures in the North. If something does not work, we need to see it as part of our learning.
- It was asked whether BHP is doing anything similar to the M1, M2 and M3 lakes compensation plan that DDMI could learn from. J. Dahl responded that, yes, the BHP is using diversion channels to lakes. The example can be used to explore impacts on spawning, migration, etc.
- It was suggested that DDMI continue to do research on the M1, M2, and M3 lakes, as there is currently not enough information about these lakes.
- It was noted that because the No Net Loss is a guiding principle, not a policy by DFO, there should be some leeway in how the principle is applied. J. Dahl replied that this is correct. If DFO receives feedback on how the principle should be used, this can be brought back to senior officials at DFO for consideration. J. Dahl clarified that, according to the Policy for the Management of Fish Habitat, the "guiding principle of No Net Loss" is defined as "a working principle by which the department strives to balance unavoidable habitat losses with habitat replacement on a project-by-project basis so that further reductions to Canada's fisheries resources due to habitat loss or damage may be prevented"
- The facilitator asked if there is any mechanism to conduct the discussion in a different venue. J. Dahl stated that it must be recognized that DDMI now has the legislation, the Fisheries Authorization. The No Net Loss plan and the addendum (as part of the EA), was available and put out for community input in the past, but no comments were received. Public meetings were held on the No Net Loss plan. Tours conducted to the M1, M2 and M3 lakes, at which Aboriginal people participated. At the tours, there seemed to be general agreement with the M1, M 2 and M3 lakes compensation plan. Amendments to the Authorization are possible, but only with DDMI and DFO at the table. Any discussions or proposed changes must recognize the rights of DDMI. The No Net Loss principle does need to be broader. There may be a possibility to have a flexibility in actual implementation of the application of the principle in the North. It cannot, however, be specific to Diavik or any one project.
- A discussion took place about the possibility of creating a compensation fund to rehabilitate fish habitat elsewhere in the region. In this way, although compensation at the Diavik site would not have restored the habitat to 100%, the residual habitat loss compensation could be compensated for elsewhere. The overriding objective should be a net gain in productivity. It was suggested that EMAB makes a recommendation to this

effect. J. Dahl pointed out that there needs to be agreement by DDMI to enter into dialogue.

- A comment was made that it would be useful to have access to DFOs work plans on these issues. What are DFO's regional priorities for fish habitat restoration? J. Dhal replied that DFO does not have a "master habitat plan". The Fisheries Management Plan has been considered a start towards developing an overall regional "plan". DFO urges everyone to provide information to DFO about problematic habitats in the region towards this end.
- It was suggested that a communications plan be established to ensure continued dialogue on this issue. G. McDonald suggested that discussion needs to include Traditional Knowledge.

Roundtable discussion included the following comments:

- Several EMAB members suggested that the M1, M2 and M3 lakes should be left undisturbed, and that support should be given to studies on compensation in other locations.
- The community of Lutsel K'e wishes to support the development in a way that ensures incorporation of traditional knowledge and by which people are provided with training. This has not yet been done in an adequate way, although efforts of DDMI are recognized.
- There is a need for greater involvement of elders and traditional knowledge in monitoring, and also to get them more involved with EMAB.
- There is a problem with trying to apply a national DFO policy at the local level.
- Fairness, from the perspective of the proponent, needs also to be taken into account, in terms of asking DDMI to make an amendment or to change the way by which they are doing their work.
- It is the role of EMAB to communicate with communities. There are specific items in the Authorization that can be changed. It is consistent with the Environmental Agreement and the role of the Board.
- We should caution against perpetuating into a "career of workshops". The EMAB forum should be sufficient to make decisions and recommendations. There are Aboriginal representatives here that can speak for their people. It is the perception that DDMI senior officials are open to a flexible approach to developing a compensation plan that works.
- DDMI can be removed from the policy discussion, however. The focus should be on DFO's approach to the No Net Loss principle and guidelines. What would be the response of senior officials at DFO to an inquiry regarding a flexible application of the principle? J.Dahl responded that the No Net Loss principle *is* a policy. While we may receive a response that we could apply the principle differently, the three goals of the habitat management policy of the Fisheries Act will not change; nor will the No Net Loss guidelines (including the hierarchy of compensation actions); nor will the ultimate aim of Net Gain.
- The facilitator asked if there is a timeline within which dialogue must take place. G. McDonald replied that the final design and plan (including the monitoring plan) is scheduled for August, 2003.

Agenda Item 4: Review and Discussion of Submissions: Fish Salvage and Fishout Reports (Presentation, Gord McDonald, DDMI)

G. McDonald:

- A fish-out study was conducted in 1999. The fish-out report on inland lakes is in progress of analysis and copmpletion.
- Two fish salvages have been conducted, using gill nets. Fish salvage reports have recently been submitted. The fish salvages found high levels of mortality when handling

the fish. (The fish that were in better condition were given to the communities) Methods will be changed so as to reduce the amount of handling.

Discussion:

- It was asked whether the problems with the fish-out data have been addressed. J. Dahl replied that Golder Associates have responded to that issue.
- J. Dahl commented that there is a concern with how the data is collected, as well as with how the data is calculated and analyzed. DFO is trying to put the data into a bigger database. DFO recognizes the need for improvement in communications between DFO and DDMI and its consultants in this regard. The department is facing a resource and capacity issue in their ability to do actual field work. There have been complications with establishing the database, related to inconsistent sampling methods and research methods, and calculations of habitat units.

Agenda Item 4: Review and Discussion of Submissions: Slimy Sculpin Baseline Metals Study (Presentation, Gord McDonald, DDMI)

G. McDonald:

- Slimy Sculpins are collected for metal monitoring. The species is appropriate to these studies due its place in the food chain. The purpose of this work is to establish a baseline.

Discussion:

- It was asked whether DDMI is banking tissue for other researchers who want to look at other pollutants in the fish. G. McDonald replied that this would not be useful, as different methods would need to be used. However, the Slimy Sculpin are also tested for **metallituine/metalnathyne (?) [Terriplan is confirming with DDMI]**. There is a hypothesis that elevated levels of this substance indicate increased stress levels.
- It was asked if this sampling relates to the sampling according to the Fisheries Authorization. G. McDonald replied that this is not the case. The Slimy Sculpin is not part of the four higher trophic level species that are monitored every five years. Section 11. 5 of the Fisheries Authorization talks of the Slimy Sculpin as baseline. These would only be sampled again if there is indication of chemical disturbance.
- A comment was made that there is pressure that DDMI does not sample too much (given the potential of impacts due to the sampling itself). Is the sampling conducted sufficient to be useful? G. McDonald replied that there are no restrictions for the Slimy Sculpin – the sampling size is sufficient. P.McCart added that DDMI has large sample sizes for the Slimy Sculpin.
- Concern was raised that data is not reported consistently in the monitoring reports. from year to year. In particular, it was noted that, in one year, measurements for flesh and organs are separated out; in the next year, these measurements are lumped together.
- P. McCart wondered why the Deep Water Sculpin is not reported on in the monitoring studies.
- The question was asked that, if the DDMI is not required to analyze the data, does anyone at DFO carry that responsibility? J. Dahl responded that if there are indications of increased metals in the sediment, DFO would do it through a “step wise” process. Additional analysis would be done if required. G. McDonald commented that there may be some merit in analyzing the validity and accuracy of the baseline data.
- P. MacCart asked why the detection limits for cadmium vary from species to species, as indicated in the monitoring report. G. McDonald replied that he would look into the reason for these results and follow-up on this.

Agenda Item 4: Review and Discussion of Submissions: Lake Trout Habitat Utlization Study (Presentation, Gord McDonald, DDMI)

G. McDonald:

- Some problems were encountered with tagging fish during the winter seasons. As deep water areas could not be easily accessed through the use of helicopter, the focus for tagging was placed on the shore-lines.
- The tagging method is analogous with the caribou collars tagging. Electronic signals are sent from the tags, although these are less powerful than those used for caribou.
- Tagging is done as a one-time study. Hydro-acoustic studies will also be conducted each year, in order to improve the consistency of data collection.

Discussion:

- A comment was made that there should be increased focus on the sex of the fish tagged, as this relates to reproduction rates.
- J. Dahl commented that the aim is to measure characteristics of the dyke area, in terms to gauge fish use of the dyke areas. It was found that the dykes are not the primary use are for Trout.

Agenda Item 5: Upcoming Submissions on Fish Palatability (Presentation, Gord McDonald, DDMI)

G. McDonald:

- DDMI recognizes the views of communities and as such wants to conduct a baseline study on fish palatability, with the idea of seeking input from both communities and scientists, potentially conducted in two separate studies. DDMI seeks feedback from EMAB as to how these studies should be conducted.

Discussion:

- There is a concern that fish gets soft in waters affected by development.
- Representatives from each community group could do field visits to Lac de Gras and sample fish for their state of health. A control site could be used, against which to compare fish from Lac de Gras.
- Preference would be to include someone with food technology expertise to talk with us first. Would prefer seeing Aboriginal people involved in the scientific study and that only one combined study be conducted. Experts in this field can be contracted, so that fish tasting be done in a systematic manner. Specific protocols will need to be developed to ensure the results can be compared in future studies.
- One suggestion was made that fish with abnormal taste be sent for chemical testing. G. McDonald commented that the problem with this approach is that taste is often not directly related to chemical balances.
- Controls are needed. Several species should be tested, of the same size and age groups.
- It was suggested that a research centre (Centre for Nutrition and the Environment of Indigenous Peoples, CINE) at McGill University has conducted studies related to First Nations and nutrition. There may be resources to draw upon.
- G. McDonald commented that this is a DDMI requirement. DDMI will need EMAB to advise on how to approach this issue. It should be a joint and cooperative process.
- A comment was made that, if it is DDMI's responsibility to find out how the fish tastes, the preferred option would have an expert, acceptable to the communities, brought in. There is also a need for official (community) tasters to participate in the whole process of gutting and preparing the fish. A comment was made that marketers who buy fish can also be consulted.

- It was suggested that EMAB will contribute to identifying individuals who may contribute to this effort. DDMI should also identify potential experts to carry out the studies. A protocol will need to be established to ensure that meaningful and comparable results are available from these studies.
- Testing should ideally take place in the months of August and September, 2002.

Final discussion:

- A question was raised as to whether a fish health study has been conducted. G. McDonald replied that the first fish health study will be available in five years, as well as the Aquatic Effects study. The report on dyke construction (and impacts on total suspended solids) will be coming up this year, and the report will be finalized at the end of the year. The report on dissolved oxygen came out in the winter of 2001. DDMI will make a copy of this report available to EMAB.
- It was asked if DDMI and BHP have cooperated on establishing data gathering protocols for cumulative effects, water quality, or aquatic effects. G. McDonald replied that all of the data is compatible. DDMI's data incorporates the data generated by BHP. DDMI has also collaborated with DIAND, but problems have been encountered with regards to differences in their data.
- G. McDonald noted that different detection methods and limits are used for the Aquatic Effects Monitoring Program (AEMP) and the Surveillance Network Program (SNP). SNP is used for measurements at the point of discharge, where DDMI is regulated to measure. AEMP measures environmental changes further out. Very low detection levels are used for all environmental samples, but this level is not needed when measuring at the SNP location.
- It was suggested that the Aquatic Effects report be distributed and presented to EMAB by DDMI upon completion.

APPENDIX A:

WORKING AGENDA FOR FISH AND FISH HABITAT WORKSHOP, FEBRUARY 20 - 21, 2002

APPENDIX B:
WORKSHOP PARTICIPANTS

WORKSHOP PARTICIPANTS*

Name	**Organization**
Environmental Monitoring Advisory Board	
Robert Turner, Chair	North Slave Metis Alliance
Floyd Adlem, vice-chair	Government of Canada
Alex Buchan	Kitikmeot Inuit Association
Florence Catholique	Lutsel K'e First Nation
Cindy Gilday	DDMI
Lawrence Goulet	Yellowknives Dene First Nation
Kirstie Simpson, Executive Director	
Johnny Weyallon	Dogrib Treaty 11 Council
Presenter/Resource Persons	
Sevn Bohnet*	DIAND
Julie Dahl*	DFO
Brenda Kuzyk*	DDMI
Marc Lange*	DFO
Karl Lauten*	MVLWB
Gord McDonald*	DDMI
Peter McCart	Aquatic Environments Limited (for EMAB)
Erik Madsen*	DDMI
Cheryl Wray*	DDMI
Other Attendees	
Ernie Camsell	North Slave Metis Alliance
August Enzo	Lutsel K'e Dene First Nation
Jack Kaniak	Kitikmeot Inuit Association
Allice Legat	Dogrib Treaty 11 Council
Tony Pearce	Dogrib Treaty 11 Council
Robin Staples	IEMA
Tracy Williams	Lutsel K'e Dene First Nation
Rachel Crapeau	Yellowknives Dene First Nation
Facilitator:	
Andy Swiderski	Terriplan Consultants
Facilitator/Recorder:	
Anna Olsson	Terriplan Consultants

*** Not attending the morning session of Day One.*

APPENDIX C

REVIEW OF THE STATE OF KNOWLEDGE
PERTAINING TO FISH AND FISH HABITATE IN LAC DE GRAS
(Overhead Presentation by Peter McCart, Aquatic Environments Limited)

APPENDIX D:

REVIEW OF THE STATE OF KNOWLEDGE PERTAINING TO FISH AND FISH HABITATE IN LAC DE GRAS: WHAT IS KNOWN ABOUT THE LAC DE GRAS AREA AND WHY IS IT IMPORTANT? (PowerPoint Presentation by Gord McDonald)

APPENDIX E:

REVIEW OF THE STATE OF KNOWLEDGE PERTAINING TO FISH AND FISH HABITATE IN LAC DE GRAS: FISH AND FISH HABITAT ISSUES RAISED IN THE DIAVIK COMPREHENSIVE STUDY AND HOW THEY WERE ADDRESSED

(PowerPoint Presentation by Julie Dahl, DFO)

APPENDIX F:

REVIEW OF REGULATORY REQUIREMENTS: MANAGEMENT AND MONITORING PLANS
(PowerPoint Presentation by Gord Mcdonald, DDMI)

APPENDIX G:

REVIEW OF REGULATORY REQUIREMENTS: FISHERIES ACT AND AUTHORIZATION AND THE "NO NET LOSS PRINCIPLE"
(PowerPoint Presentation by Marc Lange, DFO)