

**ANNUAL REPORT**  
**2008 COMPETITION**

Submitted by

GSC 09

The Environmental Earth Sciences Grant Selection Committee

April 2008

*The numbers and statistics contained in this report do not represent the final and official results of the competition; they are included to help the reader understand the context of the competition. The final and official numbers and statistics are the ones presented to the Committee on Grants and Scholarships (COGS) during their May meeting following the competition. Note that the numbers and statistics contained in the GSC annual report should not be used for any other purpose than the GSC Annual Report.*

**Membership GSC 09**

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**Brigit Viens**

Program Officer  
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## 1. OVERVIEW OF THE COMMITTEE AND THE COMPETITION

The 2008 GSC 09 was composed of three 3rd-year members (David Blowes, René Lefebvre and Cheryl McKenna Neuman), seven 2nd-year members (François Courchesne, Jim Christian, Michael Church, Robert Gordon, Alain Royer, Fran Walley and John Wilson) and three new members (Ali Aksu, Brian Cumming and Jacques Derome).

A videoconference Orientation Session was held on November 27, 2007. Both Co-Chairs, the three new members and the Program Officer participated by videoconference.

The composition of the Committee provided reasonable coverage within the spectrum of environmental earth science. Conflicts and the limited language skills of some members did not cause difficulties in fairly evaluating either English or French applications.

The workload in 2008 was heavy but less than it was in 2007. There were 30 fewer Discovery Grant applications and 21 fewer Research Tools and Instruments Grant applications in 2008 than 2007. Committee members were first or second readers on approximately 20 proposals. Total reads for each committee member ranged from 63 to 71. Five and a half days were scheduled for GSC 09 to complete its evaluations and recommendations for 125 Discovery Grant (DG) applications and 69 Research Tools and Instruments (RTI) applications. Also, three GSC 09 Committee members (Jim Christian, Brian Cumming and Cheryl McKenna Neuman) served on the Major Resources Support (MRS) Earth Sciences sub-committee with three members from GSC 08. Cheryl McKenna Neuman Chaired the MRS subcommittee. The Committee started their work at 8:30 a.m. each day and usually finished around 6 p.m.. An external viewer might well have marvelled that the Committee was in fact able to complete what it did in the time allotted for the competition.

Brigit Viens served as Program Officer and Committee Secretary for GSC 09 in the 2008 competition. Group Chair Warwick Vincent of Université Laval, NSERC Team Leader Dave Bowen and Director Norman Marcotte monitored the review process on an intermittent basis.

## 2. APPLICATIONS

There were 125 Discovery Grant applications in the 2008 competition (compared to 109 in 1999, 126 in 2000 and 152 in 2001, 147 in 2002, 115 in 2003, 126 in 2004, 144 in 2005, 128 in 2006 and 155 in 2007). There were 69 Research Tools and Instruments Grant applications (compared to 82 in 1999, 79 in 2000, 82 in 2001, 87 in 2002, 74 in 2003, 65 in 2004, 68 in 2005, 56 in 2006 and 90 in 2007). The total competition budget was \$2,246,000 for Discovery Grants and \$1,358,401 for Research Tools and Instruments Grants. The Committee reviewed one application for University Faculty Awards (compared to 3 applications in 1999, 1 in 2000, 2 in 2001, 3 in 2002, 2 in 2003, 2 in 2004, 6 in 2005, 3 in 2006 and 4 in 2007). The details of these awards are contained within the competition results in Appendix I following this report.

## 3. REVIEW PROCEDURES

The Committee continued to follow the reader/non-reader system (7 members out of 13) as outlined in the procedures document.

Conflict of interest did not significantly affect the review of applications this year. The growth in the number of adjunct positions at universities and the ever-growing research networks can pose policy problems for the NSERC conflict of interest policies. In a Committee such as GSC 09, which has a very diverse membership, an interdisciplinary character, and many individual members who come from relatively small scientific communities, conflicts sometimes meant that the Committee had limited expertise with which to evaluate some applications.

Half of the Committee members were sufficiently fluent in French to review applications submitted in French as a 1<sup>st</sup> or 2<sup>nd</sup> Reader. Therefore, French applications were given an appropriate and sufficient review by GSC 09.

The use of RTI sub-committees continues to work well and should be continued. This year, four members participated on each RTI subcommittee (field and lab).

#### 4. DISCOVERY ACCELERATOR SUPPLEMENTS

The Committee identified 10 applications that it judged were most deserving of a nomination for a Discovery Accelerator Supplements. It selected excellent and productive scientists whose research was poised to advance to a higher level but were being impeded by lack of adequate resources.

#### 5. BUDGET

The under-funding of GSC 09 is severe, and exceptional young scientists, many who have been brought to Canada as CRCs, receive an initial grant that is well below that required to initiate a viable research program. Senior researchers moving to universities from prominent government or industry positions are also affected by this funding limitation. This budget constraint is having a serious negative impact on attracting and retaining world class scientists in the environmental earth sciences. In addition, the entry level at which a new applicant enters the NSERC Discovery Grant program has lasting repercussions throughout the lifetime of the grantee, i.e., incremental increases throughout subsequent renewals means that grantees starting low will likely remain low, in comparison to those who started high. The entry level grant has fluctuated over the years, depending upon the number of new applicants and NSERC's fiscal situation in a particular year.

It should be noted that reduced support in the Discovery Grants budget and consequently, in GSC 09, is occurring at a time when there has not been a greater demand on environmental earth scientists to provide basic scientific knowledge on critical issues facing Canadian society, such as climate change, water and air quality, acid rain, earthquakes and tsunamis, drought, radioactive waste disposal, and land use change. Many of these areas do not receive much support from the private sector. We argue NSERC has a moral obligation to support environmental earth science research, as it only will contribute to Canada's economic, social, cultural and environmental prosperity.

#### 6. BUDGETING BY COMMITTEE MEMBERS

In 2007 the Committee established a minimum recommended Discovery Grant award of \$15,000/year. The minimum grant probably contributed to a decline in the success rate for News (new applicants), but in retrospect was viewed as a positive decision. An award of less than \$15,000 is insufficient to nurture quality science.

Each Committee member was given a mini-budget for their first and second reads. The other readers were asked not to exceed the higher of the two bids from the first and second readers, other than in exceptional circumstances. This policy had a positive effect of keeping the total amount awarded within the overall budget. In fact, at the end of the week, the Committee overspent by only \$2,228, and therefore no budget balancing was required.

This year, the Committee was able to meet the two criteria for new applicants (News = FN, FA, FNA and RUN). The success rate for this category increased from 52% in 2007 to 55% in 2008. The average grant for News was \$18,286, a slight decrease from last year's (\$20,177). 17% of the global GSC 09 funding was applied to News in this competition. The number of News this year (38) was considerably less than in previous years (64 in 2007; 44 in 2006; 56 in 2005; 50 in 2004).

The average funding level for returning applicants (R\$, RF\$ and RU) decreased this year to \$26,256 (from 29,345 in 2007, \$25,815 in 2006, \$26,702 in 2005, \$29,265 in 2004, \$29,750 in 2003 and \$32,000 in 2002) and the success rate this year was 82% (compared to 85% last year). The overall average grant in the 2008 competition was \$24,437 (compared to \$26,595 in 2007). The Committee recognizes that many applicants deserve far more than they receive. As in past years, returning Committee members observed that returning applicants in this year's competition, with equally meritorious proposals and very strong track records, were awarded lower funding than they would have received in previous competitions.

## 7. VOTING PROCEDURES

GSC 09 continued to use electronic voting as in recent years, again with handheld PCs and it worked generally well. The switch to a "standard" five-year award limited the number of votes on the duration of the award for returning applicants. Durations shorter than five years were assigned in 7 cases, reflecting concerns about low productivity, low HQP record or poor quality of a proposal.

## 8. ORDER OF REVIEW OF APPLICATIONS

The order of review of applications is as outlined in the 2008 Internal Procedures document and worked well. No changes are recommended. Among the News, there was one UFA proposal to consider this year. This proposal was reviewed as regular first-time applications without particular reference to its special category. The Committee ranked the UFA candidate into a quartile level relative to all FN applications.

## 9. EXTERNAL REVIEWS

Consultation reports were requested for a number of applications for which the Committee's expertise was limited or in conflict. Most of these consultations were determined at the Chairs Meeting in November 2007. In each case, the Co-Chairs identified the key issues to which the reviewers were asked to pay particular attention.

The number of external reviews that are of no help to the Committee is too large. Some reviews are not critical or were clearly written hastily after a cursory scan of the application. In several instances, reviewers recommended by the applicant seem to be uncritical and subtly or blatantly biased towards the applicant. The value of these reviews, in particular, is marginal. We recommend that NSERC provide clearer guidelines to external reviewers. These should provide a review that focuses only on the excellence of the applicant and merit of the proposal. The need for funds and training of HQP can more easily be determined by the GSCs than by the external reviewers and should not be addressed by the external reviewers.

The external reviewers reports were mainly distributed using the Extranet site and it went relatively well although some suggestions for improvement have been provided to NSERC. Four members did request to receive their external reviews by mail instead of downloading them on the Extranet. A few reviews were also circulated after the first day of the competition.

## 10. COMMENT LETTERS TO APPLICANTS

The Committee decided that a comment would be drafted in cases where: a) an applicant was given no award; b) a returning applicant received less than their previous grant amount; c) the applicant received an award period less than the 5-year standard; or d) it was felt to be necessary to provide a comment regarding the proposal or award. All applicants received a generic comment from the Committee describing the continued funding pressures on GSC 09.

Some returning applicants received a reduction in their funding, not because of a poor proposal or performance over the past five years, but due to the budget reduction imposed by NSERC's fiscal constraints. Last year, the Committee was faced with a 10% cut in its budget while this year, it was only a 1% cut.

The Committee continued to use the same approach for drafting comments as in previous years, which worked well. The first draft was written by the first reader, either by hand on an NSERC comment form or sent by e-mail to the Program Officer. An NSERC employee typed each draft for review by others. We began our review of these draft forms on day 2 and encouraged all readers to review the draft forms as they became available. The forms were left on a table at the side of the room to make them easily available. Forms were folded in half and conflicts were identified on the outside of the form to prevent those in conflict from seeing the comments. Subsequent to a review and editing by NSERC, all comments were provided to the Co-Chairs via the Extranet for final approval.

Specific times were scheduled for open review of comments, but these times were used for the evaluation of applications because of the overall shortage of time. Committee members were encouraged to edit comments during non-reader breaks. The Committee was satisfied that this had no adverse effect on the quality of comments prepared.

## 11. RESEARCH TOOLS & INSTRUMENTS (*CATEGORY 1*) and MAJOR RESOURCES SUPPORT (MRS)

Two subcommittees of four members were formed to consider the Research Tools and Instruments Grant applications: one subcommittee considered 33 "field" applications and the other considered 36 "laboratory and computing" applications. Rob Gordon chaired the field subcommittee and Mike Church chaired the laboratory/computing subcommittee. In addition, three members served on the MRS Earth Sciences sub-Committee with three GSC 08 members and evaluated nine proposals.

There were a total of 69 RTI Grant applications, requesting a total of \$4,055,874M. The success rate for this Committee was 43% (30/69) in 2008, the funding rate was 33% which translated to \$1,358,401 M in awards. The review process followed established flat distribution ranking procedures that are clearly explained in the GSC 09 Procedures Manual.

Prior to competition week, the members of the subcommittees submitted their ratings (1 to 10). The overall ranking of the applications were reviewed when the subcommittees met during competition week. The review involved first looking at applications with large standard deviations in rankings. Particular attention was paid to applications that ranked near the 30%, 40%, and 50% funding thresholds. In some cases, adjustments were made around these hinge points to improve the probability of success for new applicants. In a few cases, expensive proposals near the hinge points were moved slightly lower in the overall ranking to maximize the number of successful applicants. The need for equipment in the environmental earth sciences is great, especially for lower cost items that are not readily acquired using CFI funds and where the equipment does not fit well into the large laboratory infrastructure proposals that CFI finds attractive.

The final ranked lists from the two subcommittees were blended by selecting awards from each subcommittee – this was based on the funding rate.

Three GSC09 members were appointed to the MRS subcommittee along with 3 from GSC 08. The MRS committee meeting went smoothly and all members were satisfied with the outcome. The small number of members makes disciplinary expertise tenuous in some cases due to conflicts or language. Overall the members were satisfied with the process and did not feel that any applications were unfairly penalized by the Committee's lack of specific expertise in the area of the application.

The final ranking of the applications went quite well this year as there were fewer conflicts than last year.

## 12. MEMBERSHIP

Four members retired from the Committee in 2007 (Marianne Douglas, John Clague, Bill Miller and Peter Taylor). Dr. John Wilson was asked to take a year off the Committee in 2006-2007 due to Dr. Douglas's relocation to the University of Alberta. Therefore, three new members were appointed for 2007-2008 (Ali Aksu, Brian Cumming and Jacques Derome). Fortunately, Dr. Mike Church, who had prior experience on the Committee, agreed to serve a two-year term starting in 2006-2007. These appointments strengthened the overall Committee's expertise. Four members (Dave Blowes, Mike Church, René Lefebvre and Cheryl McKenna Neuman) are scheduled to leave the Committee after the 2008 competition.

The Committee members were asked during the policy meeting to recommend replacements for the departing members. A slate of possible candidates that recognizes the need to maintain linguistic, disciplinary, gender and geographical balance was submitted to Brigit Viens. Areas of expertise required for next year are hydrogeology/groundwater, biochemistry/geochemistry and geomorphology. The Committee noted that it could benefit from having someone from the field of landscape ecology/spatial analysis/numerical modelling of ecosystems.

The workload is heavy in GSC 09. As the word spreads, it will undoubtedly be difficult for NSERC to attract members to the Committee.

### 13. POLICY MEETING OF GSC 09

On the last day of the competition, a policy meeting was held and issues arising from the week's activities were discussed. The 2008 Policy Meeting Minutes can be found in Appendix II.

### 14. ORIENTATION OF NEW MEMBERS

A videoconference for new members was held on November 27. The three new members, Co-Chairs and Program Officer participated at their respective location. Participants agreed that the session did a good job of preparing them for competition.

NSERC staff and the Co-Chairs of 09 summarized the general procedures that are described in the NSERC Peer Review Manual as well as those specific to the Committee that are listed in the Internal Procedures document for GSC 09. They discussed at length the criteria of evaluation of the applications, and the form and presentation of an application.

The different types of applications (e.g. first time, senior productive scientists, regular scientists producing adequately) were discussed, as well as how to assess them. The discussion emphasized difficulties that arise in assessing proposals, tips for preparation of notes on each proposal, adherence to the evaluation criteria, and the importance of starting early and allocating enough time to complete the work. A general discussion of the process during competition week ensued. The orientation helped new members to understand the philosophy of NSERC and the practical application of this philosophy in the context of reviewing applications.

### 15. SUMMARY

During Competition Week GSC 09 met with Isabelle Blain, Vice-President of Research Grants and Scholarships at NSERC. During this time, Isabelle presented an update on the International Review and the GSC Structure Review. She summarized both reviews and provided information regarding the possible new direction of the structure of GSCs.

The Co-Chairs were extremely impressed with the level of dedication, professionalism, integrity, and collegiality that members of GSC 09 bring to the grant review process. The Committee members take their job seriously and make large sacrifices for marginal personal reward (in fact, one could argue that it is to their professional detriment to make this volunteer commitment). They worked hard to ensure that the process was equitable and that the recommendations were sound. We also complement NSERC on developing a process that is close as possible to the best.

Nevertheless, the level of frustration in the environmental earth science community is extremely high. The Committee is unhappy with the level of support provided by NSERC to our brightest and best scientists. It was forced to fund the top few new applicants in our field at levels around \$25,000/year for five years. These individuals are already internationally recognized world leaders in their discipline. The top new environmental earth scientists applying to NSERC receive less support than researchers of comparable productivity and reputation in some other science fields, which we consider to be an unacceptable situation. NSERC should be supporting them at double to triple their current level. The situation is so dire that it is becoming an impediment to attracting new academic researchers into environmental earth science. It also has a compounding effect because new researchers are saddled with low support for five years and likely will never reach appropriate levels of NSERC funding in a typical 20- to 30-year career. Canada is becoming an unattractive place for an environmental earth scientist to begin their career. We do recognize that the Discovery Grant program provides reliable base-level support to all good and productive scientists, which is the major advantage of the NSERC system over most other, perhaps even all, national research funding agencies.

As mentioned previously, the GSC 09 work load is very high. This situation cannot be allowed to continue, partly because of the stress this places on Committee members and partly because recruitment of the best possible members to serve on the Committee may become more and more difficult. We understand that NSERC is aware of the problem and that possible new committee structures are being discussed; those of us at the front line of the problem in GSC 09 conclude that restructuring cannot come too soon.

In spite of the heavy workload, GSC 09 maintained a high standard in its evaluations. The level of discussion was consistently civil and constructive, but contrary opinions were aired. The pace was remarkably consistent, probably because the Committee recognized that it had no choice but to keep on schedule. Meetings rarely continued past 6:00 pm but the members were still very tired by the end of the Competition. The average time allotted for each application (15 minutes) is about right.

In summary, the NSERC Discovery Grant program is an excellent one. It is exceptionally well run by a group of very dedicated researchers and exceptionally professional NSERC staff. However, the funds available are so small that the viability of the programs as foundational support to build and sustain an environmental earth science research community in Canadian universities is in jeopardy.

Dave Blowes and François Courchesne  
March 2008



**APPENDIX I**

**Environmental Earth Sciences (GSC 9)**

<b>Discovery Grant Statistics</b>	<b>Totals</b>	<b>RTI</b>	
Number of Applications:	125	Number of Applications	69
Number of Awards:	92	Number of Awards	30
Success Rate:	74%	Success Rate	43%
% of Overall Avg. Grant (\$25,901):	94%	Funding Rate	33%
Average Grant:	\$24,437	Total requested	\$4,055,874M
Funding:	\$2,248,200	Total awarded	\$1,358,401M

<b>News (FN, FA, FNA and RUN)</b>	<b>Totals</b>	<b>FN</b>	<b>FA</b>	<b>FNA</b>	<b>RUN</b>
Number of Applications:	38	17	3	3	15
Number of Awards:	21	12	1	3	5
Success Rate:	55%	70%	33%	100%	33%
% of Overall Avg. Grant (\$25,901):	71%	67%	89%	97%	59%
% of Budget:	17%	9.3%	1%	3.3%	3.4%
Average Grant:	\$18,286	\$17,500	\$23,000	\$25,000	\$15,200
Funding:	\$384,000	\$210,000	\$23,000	\$75,000	\$76,000

<b>Returning (R\$, RF\$ and RU)</b>	<b>Totals</b>	<b>R\$</b>	<b>RF\$</b>	<b>RU</b>
Number of Applicants:	87	45	28	14
Number of Awards:	71	41	24	6
Success Rate:	82%	91%	86%	43%
% of Overall Avg. Grant (\$25,901):	101%	119%	82%	61%
% of Budget:	83%	56%	23%	4%
Average Grant:	\$26,256	\$30,732	\$21,217	\$15,833
Funding:	\$1,864,200	\$1,260,000	\$509,200	\$95,000

<b>Group Grants</b>	<b>Totals</b>
Number of RGPGP	0

## APPENDIX II

### GSC 09 Minutes of the Policy Meeting February 8<sup>th</sup> 2008

#### 1. Matters arising from the competition:

- Most members appreciated the 7 voter system as it means that the majority of the GSC takes part in the funding recommendation (7 out of 13). Others felt that 5 or 6 voters would be sufficient as it would not make a major difference in the review and funding recommendations
- Members felt that the consultation reports were not particularly useful this year. It was suggested that the consultant participate by teleconference or be present during the discussion if possible.
- Increasing the interactions between GSC 08, GSC 18, GSC 1061 and GSC 1062 was encouraged.
- It was strongly suggested that NSERC modify the referee report form to indicate to reviewers to only focus on the merit of the application and the excellence of the researcher. Need for funds and HQP can easily be reviewed by GSCs and there is no need for external reviewers to comment on these two criteria.
- NSERC needs to strengthen the role of external referees and needs to convince the community of the usefulness and need for these reports.
- Some members suggested that applicants could be required to provide two letters of referees with their application.
- Some members felt that the F-180 is not detailed enough to select proper referees.
- Some members felt that the budget requested by applicants was unrealistic compared to the grant awarded. However, others felt that although it is unrealistic, it does indicate what researchers realistically need.
- The budget justification section takes a lot of time to review and is not really important. The only thing that matters is that there is no "double dipping".
- Rating forms should be simplified next year in order to remove the formatting. A plain word document would be sufficient.
- Members would appreciate the electronic copy of research contributions. They were informed that these should be available by 2010.
- Questions were raised regarding supervision and co-supervision of students. It was agreed that attending supervisory committees should not be considered co-supervision. HQP supervision can create unevenness in the evaluation of an applicant's contribution to HQP training as one institution's definition of HQP supervision might be different from another. It was suggested that a % be indicated to demonstrate the % of HQP supervision the applicant is giving to a student.
- Multi-authored papers are difficult to assess.
- Members agreed that the mini-budget system works very well and not exceeding the highest bid recommended by a member (except in exceptional circumstances) was a very good system.
- The Committee discussed the \$15K minimum for a grant and suggested that maybe \$18K or \$20K should be the minimum for next year.

#### 2. Orientation Session for new members:

This year, the orientation session took place by videoconference and went very well. The members found it useful and especially appreciated the mock review of two Discovery Grant applications.

#### 3. GSC Extranet:

Worked very well however, regarding the referee reports, members would find it very useful if they could use a "sort" button to sort through the folders as the referee reports were not posted alphabetically.

#### 4. International Review and GSC Structure Review:

Major concerns were raised regarding the GSC Structure Review. Most members felt uneasy with the new structure and recommended that changes be introduced incrementally, however, some did agree that a structure, which could include more joint reviews between GSCs was a good idea.