



CANADIAN  
METEOROLOGICAL AND  
OCEANOGRAPHIC  
SOCIETY

# Impact Project Report

April, 2024

Project and Report Provided by  
Janet Stalker Consulting

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# Executive Summary

In the fall of 2023 the CMOS Council brought on an outside consultant to explore how CMOS could grow its impact and improve its value to members. The project aimed to better understand how CMOS could better serve Canada’s atmospheric and oceanographic science (and related fields) community. Key findings and recommendations include:

## Findings: Value Proposition

CMOS needs to demonstrate a stronger value proposition to attract and retain more members. Key challenges include visibility (both internal and external) and perceptions/misconceptions related to: a lack of valuable activities or benefits beyond the Congress, the CMOS scientific scope (leaving many feeling CMOS is not relevant to their field), and a feeling that CMOS is a somewhat archaic organization that is unable to respond to the current needs of its community. Consultation identified a number of pathways for CMOS to add value to its membership. The top three included: (1) adding more content and specialized events, (2) extending the CMOS focus to more disciplines (especially applied and interdisciplinary fields), and (3) providing access to career and professional development resources and content.

## Findings: Stakeholder Priorities

Those interviewed and surveyed identified the following as areas of work CMOS should prioritize to grow its value and impact:

### **Top CMOS Priorities**

*(as identified by all those interviewed and surveyed)*

1. Serve as a voice for the Canadian atmospheric and oceanographic community
2. Increase the visibility and perceived importance of the atmospheric and oceanographic sciences
3. Foster collaboration and knowledge exchange

### **Top Student CMOS Priorities**

*(as identified by interviewed and surveyed students)*

1. Promote study and careers in CMOS disciplines
2. Improve public understanding of weather, water, climate and environment
3. Support career progression of CMOS members

## Findings: Impact

CMOS is primarily having impact through five pathways:

- **Speaking on behalf of the CMOS scientific community:** CMOS is having little meaningful impact in this area, however stakeholders consistently identified this as a top priority for CMOS. The Scientific Committee is best positioned to fill this gap, but will require a restructure and updated mandate.
- **Networking, Collaboration and Knowledge Exchange:** This is by far the area where CMOS is having its greatest impact, primarily through the Congress, however there is substantial room for growth. There is strong interest in CMOS offering more events and content, especially those that cross sectors and disciplines. There is also wide interest in CMOS becoming more inclusive of the applied and interdisciplinary sciences (not only the fundamental/research sciences), and becoming more active in facilitating collaboration and discourse that helps address scientific and societal challenges.
- **Communications:** Fragmented, uncoordinated and often outdated communications are contributing to widespread issues with internal and external visibility and reputation. CMOS needs to build staff capacity in communications, and create a strategic and coordinated approach to communications, to address these issues. Priority areas include improving member communications, creating a well populated and professional e-newsletter, overhauling CMOS communication channels, and developing a strategic approach to improving visibility and reputation.
- **Workforce and Professional Development:** The Society is having some impact in this area, primarily through awards and scholarships, student involvement at Congress, and activities of the Student Committee. However there is substantial room for growth. Students and early career professionals in particular want CMOS to provide more career related resources and activities. In parallel, there is a shortage of qualified candidates for CMOS related employment and graduate programs, particularly in the atmospheric sciences. There is strong interest from members, and potential funders, in CMOS developing workforce development and career exposure initiatives, especially those targeting equity-deserving youth.
- **Outreach and Youth Education:** CMOS efforts in this area are predominantly led by the Student and Professional Education Committee (SPEC), who have actively developed partnerships with youth and educator serving organizations to build capacity in CMOS areas of science. Beyond the SPEC, outreach and youth education activities are sparse and largely ad hoc. More direction and coordination in this area would greatly improve the Society's external reach and impact.

## Findings: Barriers to Impact

Internal barriers are significantly reducing the Society's ability to drive impact, including:

- issues with governance and structure,
- a lack of scientific direction and voice,
- significant challenges with visibility and communications, and
- a revenue model that will not sustain additional staff and initiatives.

## Recommendations

CMOS should focus its impact activities into the three areas identified below:

### Impact Focal Areas

- **Collaboration & knowledge mobilization**, with an emphasis on crossing discipline and sectoral divides, and including the fundamental, applied, and interdisciplinary sciences,
- **Workforce development**, with a priority on career exposure for youth and post-secondary students and an emphasis on those from equity-deserving groups,
- **Serving as a voice for the scientific community**, with an emphasis on addressing topics and issues of societal relevance.

The Society should place a strong initial focus on reducing barriers to impact, as mitigating barriers will improve the efficacy of impact oriented activities. Project recommendations fall into the following four themes. Specific recommendations are found on page 24, and an action plan for Phase I recommendations is provided in Appendix A.

### Priority Recommendations

- **Build capacity**: with priority on hiring staff to build communications and operations capacity, as well as staff with expertise in partnership development to grow the CMOS revenue model and mobilize funding to support additional staff.
- **Improve governance and structure**: with an emphasis on modernizing the Society's structure, and creating better mechanisms for internal communication, strategic direction, workload distribution and accountability.
- **Strengthen scientific direction and voice**: primarily by restructuring and empowering the Scientific Committee, and putting a stronger focus on fostering scientific discourse that addresses scientific and societal challenges.
- **Grow impact and value**: initially by improving the quality, scientific scope and visibility of existing activities. As operational capacity grows, work in this area will include more activities aligned with the impact focal areas noted above.

# About the Project

In the fall of 2023 the CMOS Council brought on an outside consultant to explore how CMOS could grow its impact and improve its value to members.

The project aimed to better understand how CMOS could evolve as an organization – both in terms of its internal structure and function, and in the services, events and activities it delivers – to better serve Canada’s atmospheric and oceanographic science (and related fields) community. The project was guided by several overarching questions:

## IMPACT

- In what areas is CMOS currently having impact?
- Where should CMOS prioritize its efforts to strategically grow its impact?
- What internal mechanisms and/or structural changes are needed to enable this strategic impact?

## MEMBER VALUE PROPOSITION

- What value does CMOS currently offer to its members?
- How can we improve the CMOS value proposition to better serve our current members, and to attract and retain new members?

The 2024 CMOS Impact Analysis Project and Reports were provided by Janet Stalker Consulting.

# Approach

## Phase 1

### Foundation Building

The first phase examined CMOS's current goals, stakeholders and operations as perceived/documentated by the organization itself. This included:

- one-on-one consultation with the CMOS Executive Director and all four members of the Executive, and
- review of existing CMOS materials and communications channels.

## Phase 2

### Consultation & Environment Scan

The consultation phase included one-on-one interviews (63) and a survey (319 respondents) with the goal of gathering feedback on:

- CMOS' current impact and value proposition,
- Where/how CMOS could grow its impact and strengthen its value proposition, and
- What are the general needs of the oceanographic and atmospheric sciences community, including insight on gaps and likely future trends.

The consultant aimed to interview a diverse range of individuals from across the many disciplines, sectors, and stages of career/study relevant to CMOS.

An initial group of individuals to interview were identified through recommendations from the CMOS Executive and Executive Director. However the bulk of those interviewed were identified as the project progressed, either as recommendations from those interviewed, or identified by the Consultant through their own research. See Appendix B for a list of individuals interviewed, and page nine for information on the limitations of this phase.

Phase two also included an informal environment scan, which the consultant used to better understand the broader landscape CMOS operates in, emerging trends, and the gaps and opportunities that may be relevant to CMOS in the context of strategic priorities and implementation recommendations.

# 63

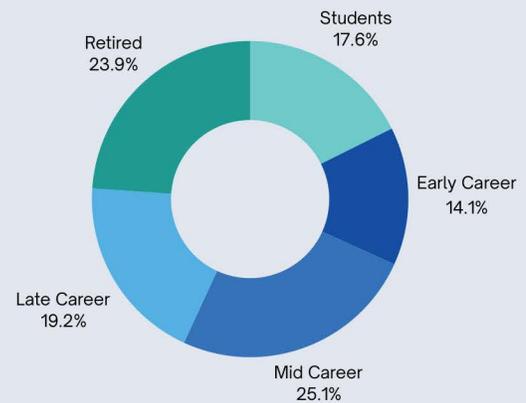
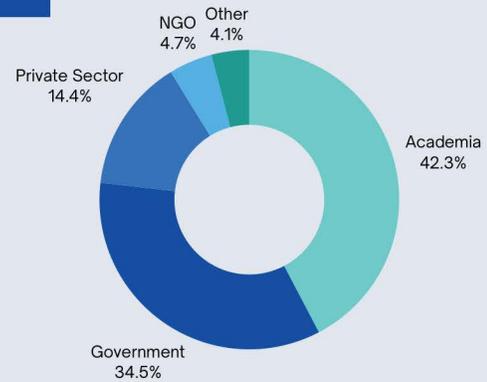
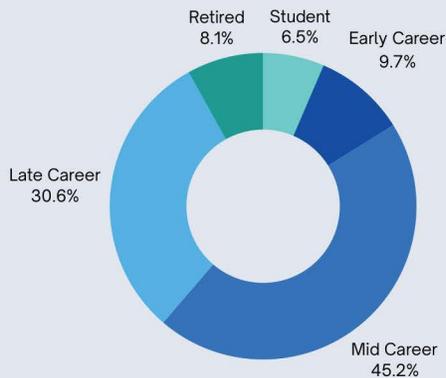
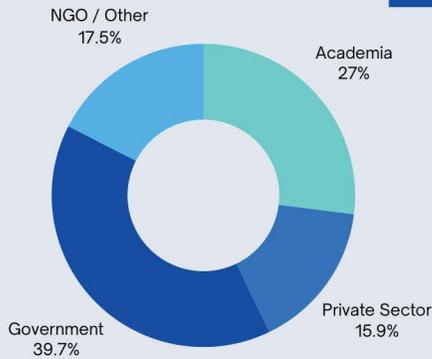
One-on-one Interviews

# 27

Internal Documents Reviewed

# 319

Survey Respondents



## Phase 3

### Analysis & Reporting

The final phase of the project involved analyzing the data and insights from the previous phases, including recommendations from the Governance Review (2021), EDIA Initiative Report (2023) and EDIA Implementation Plan (2024), and generating the Impact Project final reports and products.

# Consultation Scope

It is important to note the consultation period did not formally include specific questions around governance or equity, diversity, inclusion and accessibility (EDIA). CMOS completed a Governance Review (2021) and an EDIA Initiative (2023) – each of which involved research and interviews specific to those topics, and concluded with a set of recommendations for CMOS. An implementation plan for the EDIA Initiative Report was completed in March, 2024. As a result, governance and EDIA topics were not a specific focus of consultation in this project – although these topics sometimes came up organically. Key insights, recommendations and strategies from the aforementioned documents were included as part of the analysis work in Phase III of the project.

## Consultation Limitations

The project aimed to gain input from a diverse range of individuals spanning the many segments that comprise CMOS (e.g. discipline, sector, stage of career/study, equity-deserving groups).

### Interviews

Although the Consultant strove for a relatively equal distribution of interviews from across these segments, access to – and the interest/availability of – prospective interviewees meant the number of interviews from each segment was disproportionate. In particular, it was difficult to identify and/or obtain interviews with Francophones, individuals of Indigenous or African descent, those working in the NGO sector, those in the early stage of their career, and – rather surprisingly – with students. Many of these gaps were addressed through feedback gained from the segments via the project survey. However, it is important to recognize the shortcomings in the project, in particular with gaining perspectives from equity-deserving groups in the larger atmospheric and oceanographic science enterprise. This short coming is addressed in part through the project recommendations around EDIA.

### Survey

Although the survey was promoted widely, some sectors, disciplines and demographics had a disproportionate number of respondents. For example, the NGO sector is under-represented, as are government agencies outside of Environment and Climate Change Canada (ECCC) and Fisheries and Oceans Canada (DFO). Please be sure to review the information provided on pages 5, 6, 7, and 19 of the 2024 Impact Survey Synopsis to get a better understanding of what groups these results are most representative of.

## Definitions

The project utilizes the definition of “equity-deserving groups” recommended by Queens University’s Human Rights and Equity Office. The office defines equity-deserving groups as “communities that experience significant collective barriers in participating in society.”

# Key Findings

## CMOS Governance and Structure

The 2021 Governance Review offers a comprehensive assessment of CMOS's governance strengths and challenges, along with recommendations for enhancing its governance and operational framework. While governance was not the primary focus of the Impact Project, insights pertinent to governance emerged during the process. Insights already addressed in the Governance Review are not reiterated here. Key unique insights include:

### **Scientific Scope**

CMOS needs to build consensus, clarity and visibility of its scientific scope, including consideration about if and how to expand this scope. There is a prevailing perception that CMOS focuses on narrow areas of fundamental science, and is not responding to the urgent societal and scientific need for knowledge, discussion and collaboration across the fundamental, applied and interdisciplinary sciences. In addition, there is a clear perception among professionals in specific disciplines, especially operational meteorology, the broader atmospheric sciences (beyond meteorology), and biogeochemical oceanography, that CMOS is “not a home for them.” This sentiment is especially present among non-members.

### **Strategic Alignment of Volunteer Entities**

The CMOS Implementation Plan lacks clear alignment of implementation targets for Centres, Special Interest Groups, and most Committees. Although these entities have defined mandates, there is a need for mechanisms to ensure alignment with CMOS National, define annual implementation targets, and provide progress updates. Strategic and implementation planning is critical to driving CMOS impact.

### **Annual Review**

CMOS leadership roles and volunteer entities submit year-end reports for compilation into the CMOS Annual Review. The Annual Review is a required submission to Corporations Canada as part of the legal requirements to maintain Not-for-Profit status. Reports from volunteer entities are loosely standardized in that most include the names of Council/Committee members, a summary of activities, and a financial statement (when appropriate). Very few include an indication of goals or activities planned for the coming year. The lack of standardized data collection among the reporting leaders and volunteer entities creates challenges in assessing the annual and ongoing performance and impact of these entities, and progress towards strategic objectives.

## **Capacity Gaps**

CMOS faces significant capacity gaps in critical areas such as communications/event planning, partnership development, and program development, hindering its ability to grow its impact and contributing to significant issues with internal and external visibility.

Responsibility for partnership development is often ad hoc and reliant on volunteers, creating challenges in sustaining partnerships due to volunteer turnover.

## **Volunteer Workloads & Direction**

Volunteer workloads are often unevenly distributed, leading to challenges such as under-performance, volunteer burnout, and difficulty in recruiting volunteers for key positions. Some CMOS entities struggle to identify and advance focused activities, particularly when they have been less active in previous years and need to build momentum.

## **Executive Location**

The widespread adoption of video conferencing technology means most meetings of the Executive are now virtual. Several interviewees suggested Executive no longer needs to be tied to a physical location, noting that dropping this requirement could help recruit highly motivated volunteers into Executive roles, and could make the Executive more representative of the Society's geographic diversity. Another suggested geographic alignment was important for the Executive to build stronger working relationships with one another, and to give specific geographic regions "a turn" at setting CMOS priorities. Of note, the requirement for CMOS Executive to be tied to a specific geographic region is included in the CMOS By-Laws.

## **Revenue Model**

Currently CMOS revenue is primarily generated through Congress proceeds, membership feeds, the scientific journal Atmosphere & Ocean, and partnership funds – each of which are fairly close in financial value. CMOS will need to adjust its revenue model in order to grow its impact, especially in terms of expanding staff capacity. Partnership funding will likely be the most useful pathway to target.

## **Association Management Software**

Effective Association Management Software (AMS) is crucial for scientific societies. An AMS is the administrative backbone of the Society, providing the platform for a variety of essential functions such as financial management, tracking and managing members, facilitating membership/event registrations, communicating with members, and updating the website. The current AMS is a capital asset, allowing a percentage of the cost to be written off every year.

The CMOS Executive Director noted the current CMOS AMS, introduced in 2014, is expensive and can be frustrating to use. He is currently exploring options for a new system. This could also provide the opportunity to enable better digital communications with members – something widely cited as needed. It is essential that not just administrative functions, but also communication functions are strongly considered in the selection of a new AMS.

# Equity, Diversity, Inclusion & Accessibility (EDIA)

Extensive research and analysis, including a member survey, were conducted as part of the CMOS EDIA Initiative in 2023, addressing EDIA within CMOS and the broader weather, water, and climate sector. The resulting Initiative Report presents comprehensive findings and recommendations, followed by the EDIA Initiative Implementation Plan in early 2024. Consequently, EDIA was not a primary focus of the CMOS Impact Project interviews and survey. However, some EDIA-related insights emerged during the project. Insights not previously discussed in the EDIA Initiative include:

## EDIA as a Priority

Interviewees, particularly students and early-career professionals, frequently emphasized the importance of prioritizing action on EDIA. They expect CMOS to uphold strong core values, foster inclusivity, and advance meaningful EDIA initiatives both internally and externally.

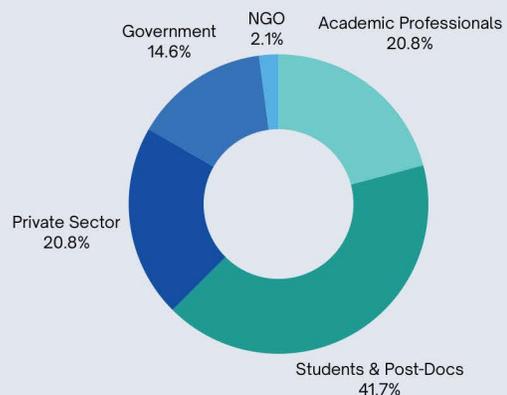
## Visitors and Immigrants to Canada

Approximately 15% of impact survey respondents identified as immigrants to Canada (using this term broadly to include all forms of international visitors and immigrants), representing the largest demographic subset surveyed. Engaging with this community through surveys or feedback mechanisms could identify specific needs that CMOS can address.

## Outreach to Equity Deserving Youth

There is wide recognition of the lack of diversity in CMOS fields and disciplines. In parallel, universities are struggling to recruit students into CMOS related programs – particularly in atmospheric science (including meteorology). Feedback suggests strong support for CMOS to engage in career exposure oriented outreach work with high school and undergraduate students, with an emphasis on youth from equity deserving groups.

Sector Distribution of Surveyed Immigrants and International Visitors to Canada



# Emerging Trends and Issues in the Atmospheric and Oceanographic Science Landscape

The atmospheric and oceanographic science landscape in Canada is experiencing a number of emerging trends and issues, driven by advancements in technology, shifts in funding priorities, changes in government policies, and evolving societal needs. Understanding these issues, and if/how they affect the needs and priorities of CMOS stakeholders, is crucial to ensuring CMOS remains relevant and valuable to its members. The prevailing emerging trends and issues identified by those consulted through the project include:

## **Growing societal importance of climate change and extreme events**

The increasing frequency of extreme weather events and climate change impacts has escalated the urgency, visibility and importance of weather and climate science to society. This has contributed to an increase in climate-related policy and regulations, growing international dialogue and collaboration around climate, the proliferation of businesses and organizations in the weather and/or climate space, and more funding directed to extreme weather and climate related work – albeit heavily skewed towards the applied end of these disciplines. While societal progress has been made in these fields, significant challenges remain including connecting subject matter experts to policy and funding decision-makers, bridging scientific expertise across disciplines and sectors, and the increasing politicization and divisiveness of climate change.

## **Workforce Development in Atmospheric Science**

Declining enrollment in post-secondary atmospheric science programs, especially in relation to meteorology, is contributing to downstream shortages in qualified candidates for employers and graduate research programs in these fields. In parallel, there is a growing need for atmospheric scientists with a strong understanding of data science and technical development, especially in the private sector.

## **Connecting ocean and climate**

Atmospheric scientists have traditionally dominated national and international scientific discussions and work around climate. However, there is growing recognition of the ocean's critical role in understanding and addressing climate change, creating demand for expertise and research in the carbon/ocean relationship, and better collaboration between atmospheric and oceanographic scientists.

**“The ocean has exploded on the stage of COP. People recognize it holds about 90% of the heat and carbon on the globe... physicists and chemists need to understand it.”**

**– Anya Waite  
CEO, Ocean Frontier Institute**

## **Increasing focus on interdisciplinary and applied science**

Science and society are increasingly faced with complex questions that require interdisciplinary knowledge and research – especially in relation to climate. In parallel, science funding organizations are prioritizing applied research that has clear benefit to society and/or industry. This is perhaps most visible in the atmospheric sciences, where research funding is increasingly directed to climate adaptation work, as compared to more fundamental research.

## **A fragmented data landscape**

Ongoing technology advancement in areas like data collection, analysis and modeling are creating better quality data and outputs, and leading to the proliferation of larger and more disparate data sets than ever before. These data are widely dispersed across a growing number of individuals and organizations, creating significant challenges with data management, visibility, accessibility and interoperability. Many historic data sets remain inaccessible, and are at risk of loss altogether.

**“If CMOS were aggressive in being a resource in helping professionals understand how data science is being applied to our fields, we would get a lot of interest right now.”**

**– Senior staff member  
of a weather-centric  
private company**

## **Rapid advancements in technology, including artificial intelligence (AI) and the rise of data science**

Big data analysis and the rise of AI and machine learning is bringing new players into the atmospheric and oceanographic science landscape, especially those with computational and/or data science backgrounds. Large, multi-national companies like Google are beginning to apply their AI capabilities to improving services traditionally performed by subject matter experts and/or scientific models, such as weather forecasting. There is considerable concern in the scientific community about how

to best utilize AI in science and science-informed services. Researchers and practitioners are struggling to keep up with the pace of technical change, and some fields, such as operational meteorology, are seeing significant disruption with potential for transformative change.

## **Growing emphasis on Equity, Diversity, Inclusion and Accessibility (EDIA)**

There is growing recognition of the importance of promoting EDIA in the scientific community, with many organizations – including government – taking steps and providing support to remove systemic barriers and improve representation in STEM fields. The way science is done is increasingly under scrutiny, with growing recognition of the importance of Indigenous, traditional, and place-based knowledge, as well as the need for better and more meaningful community consultation and inclusion in many areas of work.

# Membership & Value Proposition

## Membership Rationale (Current Members)

Almost all segments within the surveyed and interviewed membership aligned with the top three motivations shown at right. Additional trends include:

- **Free membership** was an exceptionally strong incentive for students to join CMOS.
- **Eligibility for scholarships and awards** served as a motivation for students more than any other segment, however the student number was still relatively low at only 30%. This suggests a lack of student awareness about these opportunities.
- 95% of early career professionals and 83% of post-doctoral fellows identified **growing their professional network** as a motivation for membership. The next closest segment was mid-career professionals at 62%.
- The value members place on **accessing CMOS communication channels** appears to grow as they move through their career, with students at the low end and retirees at the high end.
- Mid-career professionals and individuals in the academic and NGO sectors valued **the ability to join CMOS volunteer entities** more than any other segment.
- **Access to Atmosphere and Ocean** was of most interest to early career professionals (45%) and staff at DFO (45%).

## Top Reasons for Joining CMOS (Current Members)

- 1 To generally stay connected to the Canadian atmospheric and oceanographic community
- 2 To grow their professional network
- 3 To receive a discount to the CMOS Congress

Interviewed CMOS members struggled to identify specific benefits to membership beyond the Congress discount.

## Rationale of Non-Members

Almost all non-CMOS members interviewed and surveyed mentioned one or more of the reasons at right for not joining CMOS.

## Adding Value to Membership

There was strong alignment among both members and non-members about ways CMOS could add value to membership.

Common suggestions included:

- **More content and specialized events:**  
By far the most common response, there is a strong desire for more events – especially smaller, and more topic-specific events such as webinars, workshops and symposia on key issues.
- **Extend CMOS focus to more disciplines:** especially the applied sciences (e.g. operational meteorology) and interdisciplinary fields (e.g. climate change response and linkages with social science).
- **Improved and more regular communications:** Current members in particular noted interest in a more professional and frequent e-newsletter that also includes information beyond what is happening at CMOS. The production quality, content and tone of CMOS communications, especially the website, are seen as archaic, and symptomatic of CMOS “being stuck in the past.”
- **Access to career and professional development resources and content:** Students and early career professionals are especially interested in resources about career paths as well as access to a well populated job board. There is broad interest in training opportunities, especially to help working professionals keep up on new technologies.

## Top Reasons for Not Joining CMOS

- 1 They are unfamiliar with, or unaware of, CMOS
- 2 They don't see enough value or benefit for the cost
- 3 They feel CMOS is not relevant to their field or discipline.
- 4 They are not planning to attend this year's CMOS Congress.

- **Better and more frequent networking opportunities:** especially helping to cross disciplinary and sectoral divides.
- **Improve the Congress:** especially by expanding the disciplines, sectors and organizations involved.
- **Offering more free or discounted memberships:** including for hobbyists, early career professionals, and households with more than one member.

## First-time Members

Nearly all current and former CMOS members interviewed indicated they first became members during their time as students. Exceptions included professionals who immigrated to Canada or were already established in their careers when CMOS adopted its current structure. All students interviewed learned about CMOS through their academic or co-op supervisor.

## 95% of interviewed current and former members first joined CMOS as a student.\*

\*With the exception of those who immigrated to Canada as a professional, and those already established in their careers when CMOS adopted its current structure.

*Atmosphere and Ocean* or discounts on memberships and events offered by other scientific societies. This underscores the need for CMOS to improve communication and visibility of its existing member benefits.

## University Clubs

Some Canadian universities host student clubs or associations related to CMOS disciplines. Engaging with these groups could be a useful way to improve CMOS exposure and member recruitment among students.

## Government Employee Membership

A significant proportion of government employees are unable to expense CMOS membership fees. This segment frequently suggested CMOS offer more online events, advocate for policy change within government departments and/or explore organization-level memberships inclusive of department staff.

## End User Engagement & Membership

Suggestions were made for CMOS to increase engagement and membership recruitment efforts with large-scale end users such as NavCan, FedNav, and Transport Canada. Engagement with these groups could help grow CMOS membership and open doors for potential funding partnerships.

## Membership Renewal

A surprising number of interviewees were uncertain about their current membership status, with many expressing intentions to renew but unable to remember if they had done so. This underscores the importance of implementing an auto-renewal system for memberships.

## Visibility of Member Benefits

An unexpected number of members and non-members suggested CMOS offer benefits that it already provides, such as online access to

# Stakeholder Priorities

Through interviews and the 2024 CMOS Impact Survey, the following were identified by CMOS stakeholders as the areas of work CMOS should prioritize to grow its value and impact:

## Top CMOS Priorities

As identified by interviewees & survey respondents

- 1 Serve as a voice for the Canadian atmospheric & oceanographic community
- 2 Increase the visibility and perceived importance of the atmospheric & oceanographic sciences
- 3 Foster collaboration & knowledge exchange
- 4 Improve public understanding of weather, water, climate & environment
- 5 Promote study & careers in CMOS disciplines
- 6 Facilitate communication & share relevant news and information

## Top Student CMOS Priorities

As identified by interviewees & survey respondents

- 1 Promote study & careers in CMOS disciplines
- 2 Improve public understanding of weather, water, climate & environment
- 3 Support career progression of CMOS members

# Perceptions & Misconceptions

CMOS members are largely drawn from the meteorology, atmospheric science / climate science, or physical oceanography fields. The Society is supported by a core group of long standing members, who place particular value on the Congress. CMOS has done well to achieve impact despite significant limitations in staff and volunteer capacity. The Congress is appreciated by most delegates (the 2023 Congress had exceptionally positive feedback), however most other CMOS activities are rather disparate and ad hoc.

A small but dedicated group of highly engaged volunteers are the driving force behind most CMOS activities. Deficits in communications capacity and expertise is creating significant issues with visibility, both within and outside the organization, and is contributing to perceptions of CMOS as a somewhat lethargic organization. There are wide-spread misconceptions about the Society, especially among non-members, and those who have not attended Congress in at least a few years. Common perceptions/misconceptions, include:

- CMOS (and the Congress) is focused on narrow areas of fundamental science, and is not responding to the urgent societal and scientific need for knowledge, discussion and collaboration within and across the fundamental, applied and interdisciplinary sciences.
- CMOS (and the Congress) is of little value to those outside of meteorology research and oceanographic research (especially physical oceanography). This perception is especially common among those in operational meteorology, the broader atmospheric sciences (beyond meteorology), and the broader ocean sciences.
- CMOS (and the Congress) is led and comprised mostly of “old guard” scientists. This view was most common among early and mid career professionals.
- The Congress is CMOS’s only activity; Congress is mostly a social gathering for retired scientists; Congress is mostly presentations by Environment Canada and offers little diversity in perspectives.
- CMOS is an internal facing organization, and is not speaking for its community on key scientific and societal discussions.
- CMOS is doing little to respond to the current needs of its community, and as a result, is not helping to move its disciplines and members forward.

# Summary of Impact Findings

Without consistent data, metrics and participant feedback for most activities, the specific reach and impact of activities is difficult to quantify. However, five priority areas of activity and impact emerged. Summary findings in these areas are provided below, while detailed findings are provided in the Detailed Impact Findings in Appendix E.

## **Speaking on Behalf of the Scientific Community**

CMOS is having little, if any, meaningful impact in speaking on behalf of its scientific community. Position statements are occasionally issued by Council (three since 2020), typically under the advisement of the Scientific Committee, but are not widely or strategically communicated. Most interviewees were unaware of CMOS activity in this area, and information about how to suggest or contribute to a specific project or position statement is not available on the CMOS website. Although participation in umbrella scientific organizations such as the Canadian Consortium for Research (CCR) is important for CMOS, they typically advocate for broad sections of the scientific community, where CMOS disciplines are just a few of the many.

Interviewees emphasized the need for CMOS to assume a more prominent role in speaking on behalf of the Canadian atmospheric and oceanographic community – consistently rating this as the top priority for CMOS. They underscored the importance of enhancing CMOS's visibility and credibility, particularly among media outlets, government policymakers, and funding bodies. To have meaningful impact, it was suggested that CMOS should engage more actively in addressing key issues by publishing position papers, offering guidance to decision-makers, and raising awareness of the significance of CMOS-related disciplines.

## **Networking, Collaboration & Knowledge Exchange**

Overall, the Society's greatest area of impact is knowledge exchange, and a lesser extent, networking – principally through the Congress. Events held by Centres, Committees and Special Interest Groups also contribute to CMOS's impact in this area, although these events are far more disparate. Offering more events and learning opportunities was consistently cited as the top avenue for CMOS to grow its value proposition. Stakeholders are looking to CMOS not just to provide learning opportunities relevant to their discipline, but also to enable much needed conversations and collaboration on specific challenges and issues – especially across sectors and disciplines.

### *Congress*

The Congress is widely viewed as the Society's principal activity and area of impact – and for many (especially non-members), this is its only activity. Congress is especially impactful on knowledge sharing and, to a lesser extent, networking within the core CMOS community. It also provides valuable experience to students, especially those attending and/or presenting

at a scientific conference for the first time. The virtual Congress experience remains a challenge point, and is seen as useful for knowledge sharing, but offering little meaningful value in networking, advancing collaboration or student presentation experience. Congress is appreciated in particular by a core contingent of attendees who frequent the event. The high rate of repeat delegates suggests CMOS Congress is largely speaking to an internal audience. This is further supported by the frequency of misconceptions among non-members and those who have not attended Congress in recent years.

### *CMOS Volunteer Entities*

There is wide variation in the content, frequency, reach and impact of CMOS Centres, Committees and Special Interest Groups (SIGs). Some of these groups are quite active, and have a small, but fairly regular core following at their meetings and events. Most, however, have low activity levels or have gone dormant altogether. Across the board, activities within Centres, Committees and SIGs is largely ad hoc, and typically based primarily on the efforts of one or two dedicated volunteers within each entity. These activities are valued by attendees, but visibility and coordination remain problematic, and volunteer fatigue and turnover creates challenges in sustaining momentum. In many cases, the discussions had, and relationships developed, as a part of Committee and SIG meetings are one of their most impactful activities. Of note, very few CMOS volunteer entities are mentioned in the CMOS Implementation Plan.

### *Speaker Tour*

Centres widely appreciated this initiative, which also serves as the only scientific event for a number of Centres with low activity levels. It also underscores the efficacy of organizing events at the national level that are facilitated through the Centres. Of note, the shift to virtual webinars, rather than in-person presentations, has reduced the associated travel expenses, environmental footprint, and organizational/coordination workload of this activity.

### *Atmosphere & Ocean (A&O)*

There are mixed feelings about the CMOS scientific journal, *Atmosphere and Ocean*. It's appreciated by some, particularly in government, but is widely regarded as lacking in visibility and reputation. Although a few see A&O as obsolete and no longer needed, most interviewees expressed interest in seeing the journal revitalized, although there was little consensus on how to best accomplish this.

## **Communications**

CMOS lacks internal expertise and capacity for organization communications, leading to a lack of cohesion and a fragmented, largely ad hoc approach to communications that are largely perceived as unprofessional and contributing to perceptions of CMOS as an out of touch organization. Significant challenges with visibility of CMOS activities, both internally and externally, are severely limiting the reach and impact of the organization. Those staff and volunteers currently involved in communications are widely recognized as doing their best, but are hamstrung by lack of expertise, strategic direction, and time availability.

## **Workforce & Professional Development**

Workforce development emerged as a clear theme through this project, and is one of the primary areas of the Society's current impact – second only to networking and knowledge mobilization. CMOS work in this area is primarily seen through student and early career activities at Congress, activities of the Student Committee, and prizes, awards and scholarships. In addition, highly engaged volunteers, such as active committee members, frequently cited their volunteer experience as being especially helpful in growing their professional network and developing their leadership and professional skills and experience. CMOS professional accreditations are not widely known, and without legal standing behind them, they are largely perceived as without much weight or value in the professional context. While some feel they should be dropped altogether, others feel these designations are needed now more than ever – and that CMOS should put more effort into elevating their standing. Some also expressed interest in creating a new climate professional designation.

There is strong demand from students for more career exposure and professional development opportunities and resources, so much so that many scientific societies have made workforce or professional development a strategic priority. In parallel, issues with undergraduate, graduate and employee recruitment – especially in atmospheric science (including meteorology) – has created interest in CMOS becoming more engaged in career exposure activities targeting youth and undergraduate students.

## **Outreach & Youth Engagement**

CMOS has made strides in growing its public outreach, primarily through youth engagement. The CMOS Strategic Plan 2021 – 2024 identified education and outreach as one of its three priorities, and a range of specific tasks and projects related to outreach were included in the 2022–23 Implementation Plan. These tasks were almost entirely assigned to the School and Public Education Committee (SPEC), which, together with the CMOS Past President, has been especially effective at developing partnerships to advance its implementation targets. Through this work, CMOS is helping to develop capacity in science education, with an emphasis on teacher training and resources.

CMOS Congress and Centres also contribute to CMOS public impact. The Congress often includes a public outreach event and/or a youth engagement initiative in parallel with the Congress, which is widely appreciated by participants. Outreach and youth engagement through CMOS Centres is quite minimal and largely ad hoc, with the exception of participation and support of local science fairs. Highlights include recent work by the Halifax Centre on collaborating with local BIPOC-focused youth organizations, ongoing work in the BC Interior and Saskatchewan Centres to provide and maintain weather stations at local schools and libraries, and educational activities carried out by the Toronto Centre.

# Barriers to Impact

The project identified the following primary underlying barriers to CMOS growing its value and impact:

## **External Communications, Visibility & Reputation**

CMOS is operating in an increasingly crowded scientific landscape, making it more difficult to be seen and heard. The “build it and they will come” approach will not work in the modern landscape. CMOS must clearly articulate its role in the Canadian scientific enterprise, and work pro-actively on growing the external presence and reputation of the Society and its activities.

## **Internal Communications & Visibility**

A surprising number of active members are unaware of benefits, activities or structures within the organization, indicating a clear and cross-cutting challenge with internal communications.

## **Volunteer Capacity**

A small number of dedicated volunteers are responsible for the majority of CMOS activities. CMOS needs to do better at recruiting, onboarding and empowering volunteers, while also improving workload distribution and creating mechanisms for accountability.

## **Staff Capacity**

CMOS lacks staff expertise and capacity in critical areas, particularly in communications, partnership development and program development. Some responsibilities currently delegated to volunteers may need to be reallocated to staff or contractors to ensure forward momentum on key tasks and priorities.

## **Revenue Model**

With volunteerism on the decline, CMOS must reshape its revenue model to mobilize more revenue and funding to support growth in staff capacity. Initially, this should focus heavily on partnership development, with long term aims of also growing revenue streams through Congress, special events and *Atmosphere & Ocean*.

## **Strategic Planning & Alignment**

Most CMOS volunteer entities are run ad hoc, and are not included in the CMOS Implementation Plan. Mechanisms are needed to strengthen CMOS implementation planning, and to improve strategic alignment between CMOS National and CMOS volunteer entities. This includes creating requirements around annual strategic planning, data collection and reporting for CMOS entities.

# Recommendations

CMOS needs to reduce its underlying barriers to impact, while also adopting a strategic approach to growing its impact and value proposition. Of note, specific communications-related recommendations are not included, as those will be best addressed through a communications strategy generated by a newly hired Communications and Operations Manager.

Strategic recommendations are broken into two phases as noted below. Specific implementation actions for each Phase I recommendation are provided in the Impact Project Action Plan (Appendix A).

- **Phase I:** top recommendations – aim for significant progress and/or completion by the end of 2024.
- **Phase II:** secondary recommendations – aim for significant progress and/or completion by the end of 2025. Take on Phase II recommendations as early as capacity allows.

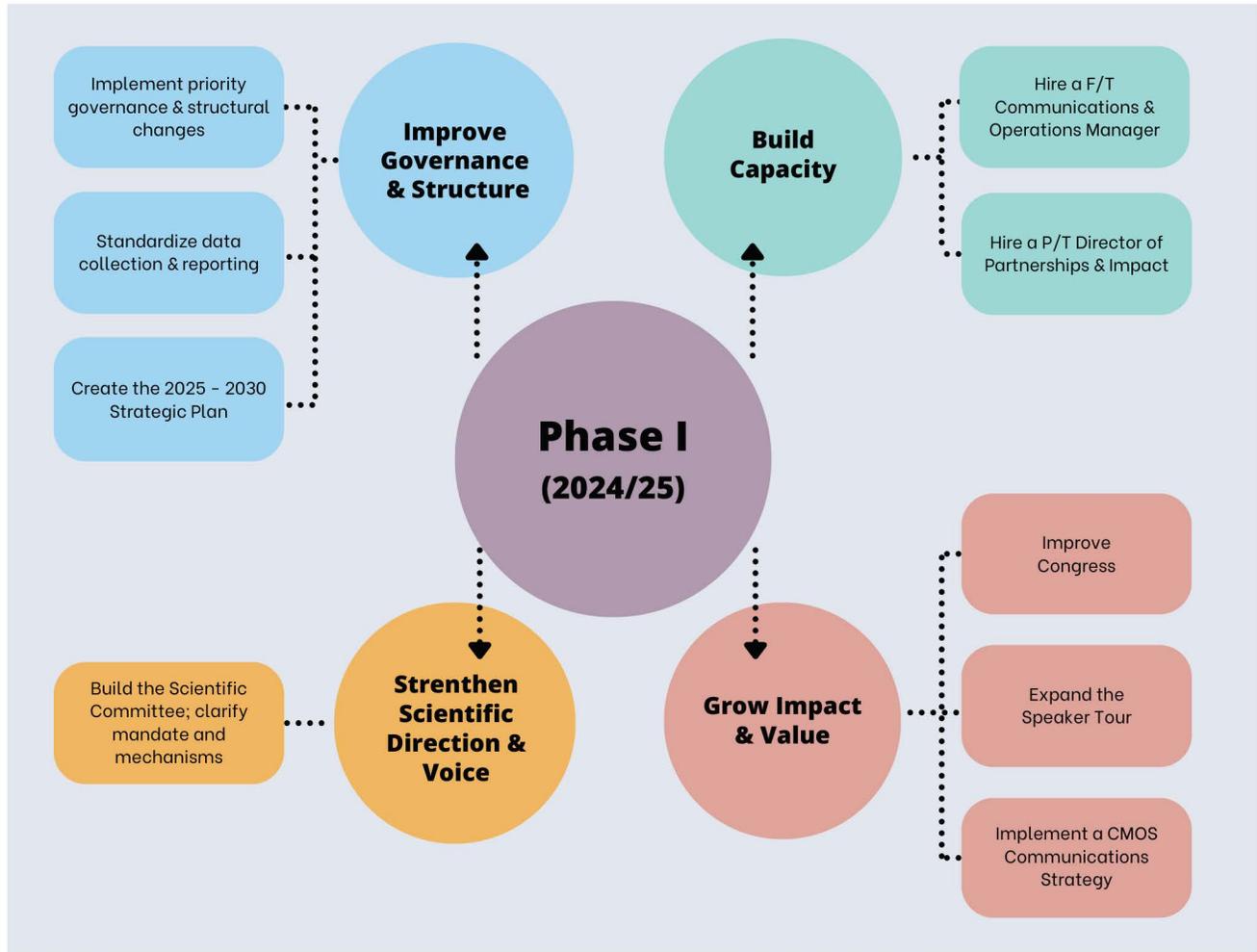
A strong focus on reducing barriers to impact, especially by building staff capacity, is recommended. This work will significantly improve the efficacy of impact activities.

## Impact Focal Areas

CMOS should focus its impact activities into the three areas identified below:

- **Collaboration & knowledge mobilization**, with an emphasis on crossing discipline and sectoral divides, and including the fundamental, applied, and interdisciplinary sciences,
- **Workforce development**, with a priority on career exposure for youth and university students and an emphasis on those from equity-deserving groups, and
- **Serving as a voice for the scientific community**, with an emphasis on addressing topics and issues of societal relevance.

# Phase I Recommendations



## Phase I: Build Capacity

Volunteerism is on the decline across Canada, and is expected to continue in this direction. CMOS needs to grow its staff capacity to meet the critical needs of the organization and improve its value to members. This is especially important in relation to communications and operational support. With limited existing budget, CMOS will need to develop partnerships that provide funding and/or generate new revenue streams to support additional staff.

1. Hire a full time **Communications and Operations Manager**, with an initial focus on developing and implementing a communications plan.  
(annual salary range typically \$65,000 - \$80,000)
2. Hire a part-time **Director of Partnerships and Impact**, and focus their efforts on developing funding and collaborative partnerships in support of scientific discourse, workforce development, and EDIA initiatives.  
(annual salary range typically \$80,000 - \$115,000)

## Phase I: Improve Governance and Structure

CMOS must improve its governance structure and mechanisms to strengthen the organization, with an emphasis on enabling stronger leadership and better direction, accountability, strategic alignment, workload distribution, internal communication and operational flexibility. This will improve the Society's ability to advance strategic priorities, grow its impact, and attract and retain committed volunteers. This will be an ongoing process, which can initially begin with the priority recommendations below. However a more substantial restructure is needed, and is included as a recommended project in Phase II.

3. Implement priority governance and structural changes.
4. Standardize data collection and reporting across CMOS National and all volunteer entities.
5. Create the 2025 – 2030 CMOS Strategic Plan.

## Phase I: Strengthen Scientific Direction and Voice

Science and society are increasingly faced with complex questions that require discourse, collaboration and communication across disciplines and sectors, as well as across the fundamental, applied, social and interdisciplinary sciences. In parallel, CMOS is widely perceived as having too narrow a focus on research science in meteorology and physical oceanography, and not doing enough to connect science to society. CMOS needs to clarify and modernize its scientific scope, and provide strong scientific leadership to ensure its activities enable discovery, discourse and solutions that help address scientific and societal challenges.

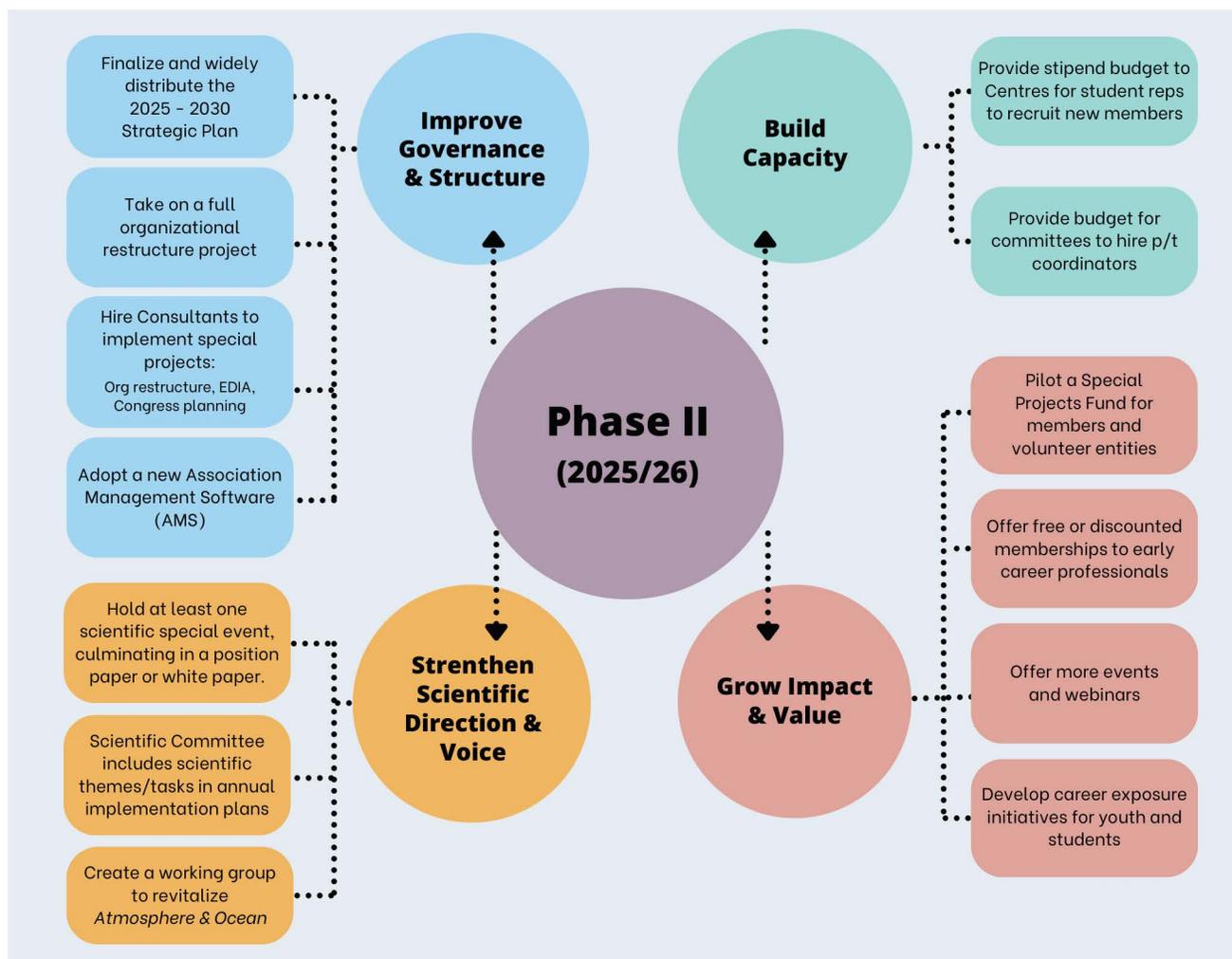
6. Restructure and empower the Scientific Committee to provide stronger scientific leadership and direction; clarify the Committee's mandate and mechanisms.

## Phase I: Grow Impact and Value

Initially, impact and value proposition activities will need to center around strengthening and improving visibility of existing activities and member benefits. However, as core barriers to impact (page 23) are reduced, the Society's ability to expand its operations and activities will grow, allowing the organization to explore new pathways to grow its impact in priority focal areas (page 24) and add value to membership (page 16).

7. Improve the Congress; become more inclusive of the applied and interdisciplinary sciences, involve a more diverse range of speakers (e.g. different organizations, sectors, expertise, cultural perspectives), and offer more sessions enabling discourse on scientific and societal challenges. Ensure future Congresses are held in collaboration with other events.
8. Expand the Speaker Tour into a national webinar series.
9. Create and begin implementation of a CMOS Communications Strategy.

# Phase II Recommendations



## Phase II: Improve Governance and Structure

1. Finalize and widely distribute the 2025 – 2030 Strategic Plan.
2. Hire a consultant to work with Executive and staff to create and implement a full restructure and governance overhaul of the organization. Recommendations include consolidating Centres into larger regions, redistributing Council responsibilities, revising By-Laws and policies, and revising Committee terms of reference.
3. Hire consultants to advance special projects, including the organizational restructure project, EDIA implementation plan activities (under guidance of an appointed EDIA officer or working group), and development of Congress organization and planning tools (under guidance of the Congress Committee). Also provide remuneration for the Publications Director in recognition of this volunteer’s considerable workload and responsibility.

4. Adopt a new Association Management Software (AMS) for the organization, and train necessary staff and volunteers on its use.

## Phase II: Build Capacity

5. Provide Centres with budget (approx \$1,000– \$1,500) for student representatives to promote CMOS and recruit new members at their universities. The Communications and Operations Manager can provide the students with promotional materials.
6. Provide budget for impact-oriented Committees to hire part time coordinators (a few hours a month) to help advance their work. Look to students and early career professionals for these roles. Prioritize the Student Committee, Scientific Committee, Publications Committee and/or Editorial Boards, Congress Committee, and the Student and Public Education Committee.

## Phase II: Strengthen Scientific Direction & Voice

7. Scientific Committee identifies scientific themes/tasks for the annual CMOS Implementation Plan, and ensures they are communicated broadly across the organization – especially to Congress and National webinar series organizers.
8. Scientific Committee hosts at least one scientific workshop on a scientific or societal issue that culminates in a position statement, white paper, or other output. Consider the “Emerging Trends and Issues” section of this report (page 13) for issues of interest among membership.
9. Establish a working group devoted to revitalizing *Atmosphere & Ocean* – focus on implementing ideas already identified in Appendix E (page 45), the EDIA Implementation Plan (2024), and the Governance Review (2021). The Publications Committee and Scientific Committee could provide oversight to this project.

## Phase II: Grow Impact and Value

10. Pilot a Special Projects Fund, which any CMOS member or entity can apply to for small amounts of funding (\$500 – \$2,500) for a project or initiative that advances any one or more of the Society’s strategic objectives. Keep the process simple.
11. Offer free or discounted membership for Early Career Professionals (widely promote).
12. Continue offering more events and webinars, with an emphasis on events and content organized in collaboration with other organizations to improve reach and enable communication across sectoral and disciplinary silos. Prioritize events that facilitate discourse on scientific and/or societal challenges.
13. Develop career exposure activities and initiatives for students and youth; with an emphasis on equity-deserving youth. Aim to partner with organizations that serve these communities to help build educational capacity and opportunities.

# Appendix A: Action Plan

## Phase I Recommendations

### 1. Hire a full time Communications and Operations Manager

(Annual salary range typically \$65,000- \$80,000)

- This individual will initially be largely communications-focused, as there will be a heavy workload associated with getting a communications strategy in place and developing priority communication channels and assets. Once these assets are in place, the Manager will manage and support communications and operational needs of the organization, such as publishing e-newsletters, advancing special projects, and coordinating webinars and events.
- The communications strategy should include:
  - a coordinated approach across all CMOS entities and communications channels,
  - a strategic approach to member communication and stewardship,
  - an e-newsletter providing news and information relevant to CMOS disciplines,
  - a modern and useful CMOS website, a better social media presence – particularly on LinkedIn, and a well populated and highly visible job board,
  - promotional strategies to drive member recruitment, volunteer participation, and Congress attendance, and
  - promotional strategies to grow the Society’s external visibility and reputation, including supporting the dissemination of position statements and other activities of the Scientific Committee.

### 2. Hire a part time Director of Partnerships and Impact

(Annual full-time equivalent salary range typically \$80,000 - \$115,000)

- To sustain additional staff and offer more events, programs and initiatives, CMOS will need to hire someone with experience and expertise in developing partnerships that will generate funds for the Society, and catalyze collaborative events and initiatives with other organizations.
- This person should place emphasis on developing partnerships and collaborations in support of scientific discourse, workforce development, and EDIA initiatives. See Appendix C for collaboration and funding opportunities.

### 3. Implement priority governance and structural changes

**Executive/Council:**

- Appoint Councillors-at-Large as Co-Chair of the Scientific Committee and Congress Committee, with the goal of revitalizing these committees, and improving coordination between Council and these committees.
- Ensure all staff positions have clear job descriptions and responsibilities, and implement annual performance accords between Council and the Executive Director. Empower the Executive Director with stronger leadership and decision making responsibilities to help drive the organization forward.
- Ensure responsibility is assigned to a specific person or entity for all Implementation Plan targets.

#### At Annual General Meeting (proposed changes to By-Laws):

- Remove the requirement for Executive to come from a single Centre. Hold open calls for nominations, including self-nomination, to fill positions without geographic restrictions to help recruit highly motivated volunteers into the roles.
- Formally assign two year terms to the President and Treasurer positions.
- For all volunteer positions given a maximum term in the By-Laws, add the caveat that volunteers may choose to hold the position beyond this term length if no other volunteers have accepted nomination.
- Scientific Committee: Move responsibility for scholarships to a different committee (consider the Prizes and Awards Committee). Revise the structure and mandate of the Scientific Committee to provide scientific leadership and direction for the organization (see Phase I Recommendation #6)

#### **4. Standardize data collection and reporting.**

- CMOS National and all volunteer entities: collect demographic information, including membership status, discipline/area of work, stage of career, sector, primary language, and if part of an equity-deserving group as part of member registration/renewal, committee/centre/SIG membership, and all event registrations. Also collect attendance/reach numbers for events and communications across the organization. Include this information in annual reports.

#### **5. Create the CMOS 2025 – 2030 Strategic Plan.**

- Establish a working group, and consider hiring a consultant, to create a five year strategic plan for CMOS. The plan should include clarity on the CMOS scientific priority(s) and impact priorities. Consider placing an emphasis on fostering scientific discovery, discourse and collaboration that addresses scientific and societal challenges.
- Given the relatively consistent nature of the Society's needs and priorities, a five year plan may better serve the organization (compared to a three year plan), as it will reduce the workload associated with creating new strategic plans. Keep the strategic plan very high level, and utilize implementation plans for specific direction and annual priorities.

#### **6. Build the Scientific Committee; clarify the Committee's mandate and mechanisms.**

- Restructure the Scientific Committee to include experts that are representative of CMOS disciplines/areas of work. Empower the Committee to provide scientific leadership to the Society. Remove responsibilities for scholarships. New mandate should include:
  - clarifying and communicating the CMOS scientific scope
  - establishing scientific priorities for implementation plans,
  - providing scientific direction to the Congress Science Program Committee and event organizers, including the Speaker Tour/CMOS Talks webinar series,
  - publishing position statements, white papers, and other scientific outputs, while also clarifying mechanisms for soliciting ideas and gathering scientific input from the CMOS community,
  - hosting events to foster discourse, coordination and collaboration that addresses specific scientific and/or societal challenges, and
  - proactively liaising with the media and decision makers in policy and funding organizations.

## **7. Improve the Congress.**

- A variety of suggestions and recommendations to improve the Congress were identified by the project (page 41). Provide this information to the Congress Committee, Local Arrangements Committee, and Scientific Program Committee for the 2024, 2025, and 2026 Congresses.
- Make the content more inclusive of the applied and interdisciplinary sciences, and offer more sessions enabling discourse on scientific and societal challenges. Overarching direction on this should come from the Scientific Committee.
- Involve a more diverse range of speakers (e.g. different organizations, sectors, expertise, cultural backgrounds and perspectives).
- Continue discussion with DFO and ECCC about group registration for the Congress to increase government attendance. Explore a multi-year commitment that would cover registrations for multiple Congresses.
- Re-energize the Congress Committee (including having a Councillor-at-Large serve as co-chair). Initially, focus on improving Congress visibility, the virtual experience, and planning tools/structures that will help with Congress organization so LAC's are not left feeling they are "starting from scratch."
- Clarify and delineate the roles and responsibilities of all aspects of the Congress, including Congress promotion, student activities, and analysis of registration and survey data.

## **8. Expand the Speaker Tour into a national webinar series.**

- Offering more events and content emerged as one of the top pathways to add value to membership. Start by expanding the Speaker Tour into a larger national webinar series. Aim for four webinars in the first year, and ensure these are widely communicated and promoted. They should be free for members, and at a cost to non-members. Invite Centres, Committees and SIGs to contribute additional content.
- There is strong interest in events that go beyond highlighting a specific research project. Consider making at least two of the national webinar series events panel discussions on a specific scientific and/or societal issue or challenge.

## **9. Create and begin implementation of a CMOS Communications Strategy.**

- The responsibility of the Communications and Operations Manager, the strategy will provide a coordinated communications approach across all CMOS entities. Initial priorities should include growing internal and external visibility of CMOS and its activities, establishing a well populated e-newsletter, and overhauling the website.

# Appendix B

## List of Interviewees & Documents Reviewed

### Project

#### Interviewees

- Gordon Griffith
- Leonard Barrie
- Jinyu Sheng
- Gordon McBean
- Marek Stastna
- Paul Myers
- Anya Waite
- Kimberly Strong
- Aldona Wiacek
- Katja Fennel
- Karen Smith
- Eric Oliver
- Julie Theriault
- Hind Al-Abadleh
- Laura Gillard
- Ada Loewen
- Joseph Huang
- Ruby Yee
- Jim Abraham
- Serge Desjardin
- Abdoulaye Harou
- David Grimes
- Marty Taillefer
- Diane Campbell
- Scott Graham
- Marie-Chantal Ross
- Paul MacDonald
- Nathalie Morin
- Scott Weese
- Greg Smith
- Cindy Yu
- Felix Vogel
- Marshall Hawkins
- Andrea White
- Nancy Soontiens
- Michael Dunphy
- Shannon Nudds
- Laura Bianucci
- Helena van Mierlo
- Ruth Digby
- Amber Holdsworth
- Brennan Allen
- Natasha Ridenour
- David Fissel
- Harinder Ahluwalia
- Barry Stevens
- Diar Hassan
- Levi Morrison
- Chris Scott
- Scott Kehler
- Nahla Sherif
- Sebastiaan Ambtman
- Laura Twidle
- Jim Handman
- Josephine Tsang
- Janice Lachance
- Ivan Semeniuk
- Ella Clarke
- Ryan Ness
- Maggie Romuld
- Stella Kafka
- Diz Glithero
- Dominique Paquin
- Asher Trim-Gaskin

#### Internal Documents Reviewed

- Annual Review 2018
- Annual Review 2019
- Annual Review 2020
- Annual Review 2021
- Annual Review 2022
- CMOS Budget 2024
- CMOS By-Laws 2021
- EDIA Initiative Report 2023
- EDIA Initiative Implementation Plan 2024
- Governance Review 2021
- Strategic Plan 2018–2020
- Strategic Plan 2021–2024
- Implementation Plan 2021–22
- Implementation Plan 2022–23
- Environmental Scan, SWOT for CMOS 2017
- Council Meeting Minutes, Nov 28, 2023
- Membership Breakdown Report Jan 8, 2024
- CMOS Membership Trends 2011–2022
- CMOS ECCC 2020–25 Funding Agreement
- CMOS ECCC 2022–25 Funding Agreement
- DFO Funding Agreement 2023–27 (CNC–SCOR)
- Demographic Survey 2023 (Eng & Fr)
- Strategic Plan (2021–24) Survey
- Congress Survey 2021 (Eng & Fr)
- Congress Survey 2023 (Eng & Fr)

# Appendix C

## Collaboration Opportunities

Please contact the CMOS Executive Director for Appendix C content.

# Appendix C

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Please contact the CMOS Executive Director for Appendix C content.



# Appendix D

## Canadian Meteorological and Oceanographic Society (CMOS)

Canada's home for weather, climate and ocean science

CMOS is the national scientific society of individuals dedicated to advancing the atmospheric and oceanographic sciences, and related environmental disciplines. With over 750 members from across all sectors, CMOS is the preeminent home of scientific learning and discourse in the Canadian weather, ocean and climate enterprise.

### Why Join?

#### Connect

Connect with the Canadian atmospheric and oceanographic community, and grow your professional network across sectors and disciplines.

#### Learn

Learn from innovative and emerging experts, entrepreneurs and thought leaders that are the driving force behind Canada's weather, ocean and climate enterprise.

#### Contribute

Contribute your time and expertise to volunteer initiatives and scientific discourse on key issues.

#### Grow

Grow through professional development and career exposure activities, including content designed specifically for students and early career professionals

#### Share

Share your research, expertise and insights with the community

### Exclusive Member Benefits

- Online access to the scientific journal *Atmosphere & Ocean*
- Participate in local events through a CMOS Centre
- Eligibility for awards and scholarships
- Discounted rate for the CMOS Annual Congress
- Discounted membership rates with the American Meteorological Society, the Royal Meteorological Society, and the Australian Meteorological and Oceanographic Society



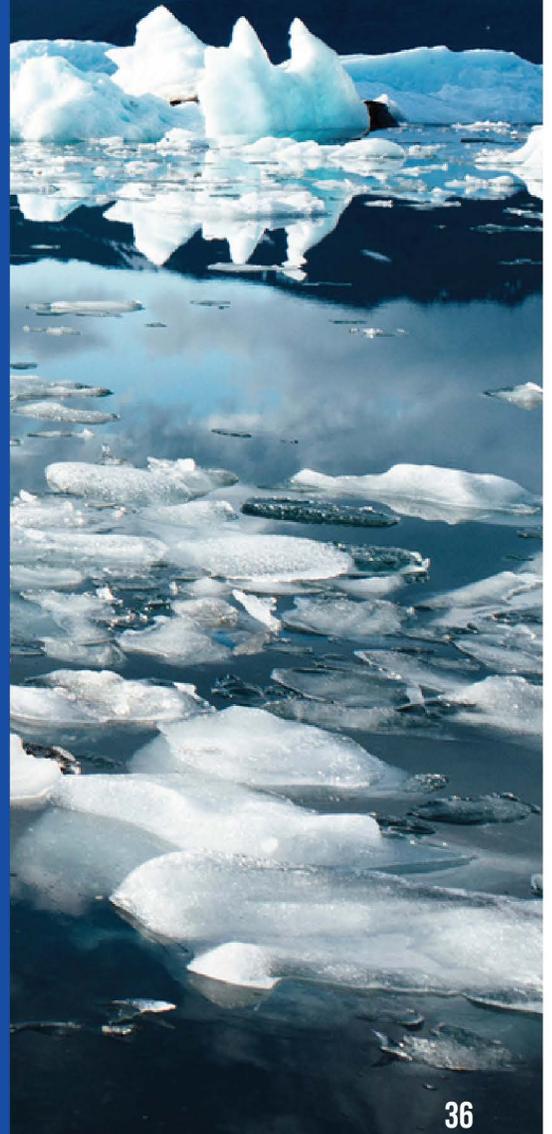
# Appendix E



CANADIAN  
METEOROLOGICAL AND  
OCEANOGRAPHIC  
SOCIETY

## Impact Project: Detailed Impact Findings

April, 2024



# Speaking on Behalf of the Scientific Community

Scientific societies are uniquely positioned in the scientific landscape to speak on behalf of their scientific community. They are largely seen as independent, unbiased, and representative of science across all sectors. This role is one of the few that does not place CMOS in competition with other Canadian organizations.

Interviewees emphasized the need for CMOS to assume a more prominent role in speaking on behalf of the Canadian atmospheric and oceanographic community – consistently rating this as the top priority for CMOS. They underscored the importance of enhancing CMOS's visibility and credibility, particularly among media outlets, government policymakers, and funding bodies. To have meaningful impact, it was suggested that CMOS should engage more actively in addressing key issues by publishing position papers, offering guidance to decision-makers, and raising awareness of the significance of CMOS-related disciplines.

Interviewees cautioned that CMOS work in this area should not fall into opinion or political based advocacy, but instead focus on creating and disseminating evidence-based scientific information to those in relevant decision-making roles.

A selection of examples provided by those interviewed and surveyed include:

- Convening a discussion and generating a position paper on the use of artificial intelligence in operational meteorology,
- Advising government on the need for more support for private sector growth,
- Advising government funding entities around funding priorities for research in CMOS disciplines,
- Information for universities about programs and courses needed to meet modern workforce needs, especially in relation to climate and the private sector,
- Spearheading initiatives to better understand the societal impact of scientific research. For instance, coordinating efforts akin to an Inter-governmental Panel on Climate Change (IPCC) process conducting impact studies on the societal implications of climate change.
- The Canadian Climate Institute expressed interest in potentially collaborating with CMOS to create an authoritative, “one-stop place” for interested policy practitioners to read accessible material about the state of climate science and important developments.

CMOS should engage more actively in addressing key issues by publishing position papers, offering guidance to decision-makers, and raising awareness of the significance of CMOS-related disciplines.

## Responsibility

With responsibility to act on scientific matters of concern to the Society, the Scientific Committee is meant to serve as the scientific voice of CMOS. This includes identifying and promoting key scientific issues to the CMOS community, and providing a scientific perspective or position to the government and public. Although any member may suggest a project to the Committee, there is not a formal mechanism for soliciting input on project ideas, such as topics for special scientific meetings or position papers. It also appears the mandate of this Committee is not widely known, as many of those interviewed expressed surprise that there was an entity with this responsibility within CMOS.

Of note, CMOS previously made efforts to introduce a Chief Scientific Officer role to provide leadership in the scientific voice of the organization. Council was unable to find a willing volunteer to fill the role.

## Position Statements

Although CMOS occasionally issues position statements, the process is infrequent and appears largely ad hoc. The Scientific Committee creates position statements, and submits them to Executive for approval. The Committee does not have formalized mechanisms for soliciting input on the topic of position statements, gathering input from the community to inform the position statement, or communicating the statement.

Position statements must be well communicated to target audiences to drive meaningful impact.

Position statements are typically posted to the website, CMOS National social media channels, and shared with members via e-mail. They are not usually shared with the media or stakeholders outside of membership. Most interviewees were unaware CMOS had a history of issuing position statements, and expressed a lack of clarity around how CMOS position statements are informed.

## Liaising with Policy and Funding Organizations

CMOS does not have institutional mechanisms or relationships in place to facilitate direct communication with policy and funding decision makers in Canada. Through membership in other organizations, such as the Canadian Consortium for Research, CMOS representatives provide input on broader projects designed to inform these entities. Interviewees frequently noted the need for better engagement with policy and funding organizations, with several pointing to the activities of the American Geophysical Union as an example of the type of government communication and advocacy CMOS should engage in.

### *Role in Engaging with Funders*

There is a perception among leadership that CMOS should not engage with discussions with funding organizations, as universities are more representative of the research community and are therefore better positioned to do this work. However, a significant number of academic professionals – predominantly in the atmospheric sciences – expressed interest in CMOS acting in this capacity. The University and Professional Education Committee (UPEC) is well positioned to do this work, although it has only recently become active again after lying dormant for four years.

## Networking, Collaboration & Knowledge Exchange

Scientific societies were first established to serve as a forum for sharing knowledge and ideas at a time when other pathways were largely absent. The modern scientific landscape is far more crowded, with more organizations providing pathways to communicate and share science than ever before. Increasingly, stakeholders are looking to scientific societies not just to provide learning opportunities relevant to their discipline, but also to enable much needed conversations and collaboration on specific challenges and issues – especially across sectors and disciplines.

Stakeholders are looking to scientific societies to enable much needed conversations and collaboration on specific challenges and issues – especially across sectoral and discipline divides.

### **CMOS Annual Congress**

Interviewees consistently cited the CMOS Congress as the source of the Society's greatest impact. It is by far the most visible activity of the Society – and for some, there is a perception this is the Society's only activity. It has a relatively small, but devoted contingent of regular attendees, who look forward to it as a social and educational gathering with their colleagues and are largely satisfied with the event. Students and academic supervisors frequently described the Congress as a good "starting conference", as its small size makes it easier to network and less intimidating than larger conferences.

### *Key Insights from Congress 2023 Survey*

Several key insights were identified from the Congress 2023 Delegate Surveys. Notably it is difficult to compare these to the past few Congresses, due to COVID-restrictions forcing virtual Congresses and a lack of consistent survey questions across Congresses. Of the 155 Congress 2023 Survey respondents (combined across the English and French surveys):

**Excluding students,  
79% of surveyed  
CMOS 2023  
delegates had  
attended CMOS  
Congress before.**

- This was the first CMOS Congress for 63% of students.
  - 79% of all other attendees (excluding students) had attended a CMOS Congress before.
  - 73% of virtual attendees had attended a CMOS Congress before.
  - In-person attendees largely rated their experience satisfactory (49%) or exceptional (41%)
  - Virtual attendees largely rated their experience satisfactory (58%) or unsatisfactory (20%). Feedback showed particular frustration among those presenting remotely through the virtual platform.
- There was strong positive feedback among all attendees on the scientific program, largely rating it satisfactory (58%) or exceptional (30%).

### *Negative and/or Exclusionary Perceptions*

For some, especially early career professionals, Congress is perceived as “a social gathering for old-guard scientists”. Others, especially mid-career professionals and those from the private sector, see Congress as “an Environment and Climate Change Canada showcase with little to offer from other perspectives.” Segments that frequently expressed perceptions of lack of inclusion or relevance at Congress include those working in operational meteorology, atmospheric science (beyond meteorology), biogeochemical oceanography, science policy, climate adaptation, and social science. Of note, these perceptions were most common among non-members and those who did not attend the previous Congress.

### *Government Attendance*

The Congress has seen declining attendance in recent years, driven in part by increasing government restrictions on travel and conference attendance. Government employees frequently expressed frustration with the lack of travel and registration support from their department, and

were appreciative of the Society’s recent efforts to provide more online content and department wide registrations for government entities. One government manager finds it especially challenging to send their employees to large, multi-discipline/topic events as its unclear which staff are the most suitable to attend. This individual noted it is far easier to

**The trend in reduced  
government travel  
“is here to stay.”**

justify sending staff that have a defined role in the Congress (chairing a session, coordinating sessions, etc.). Across the board, government managers and leaders were clear to reiterate this trend of reduced government travel “is here to stay.”

### *Suggestions for Improvement*

Although widely seen as the area of greatest CMOS impact, the bulk of those interviewed expressed a need for Congress to improve and modernize in order to increase attendance and remain relevant. Suggestions included:

- communicating the specific topics and presenter names of all sessions far earlier, to better inform decisions about attendance,
- improving the digital experience for virtual attendees and presenters, consider using online engagement platforms like Gather Town,
- more interdisciplinary and applied content (e.g. climate adaptation, advances in operational technology, social science linkages, and flood, wildfire and smoke forecasting)
- more content connected to policy,
- representation from a more diverse range of organizations, including more private sector and government entities beyond ECCC,
- hosting a one day student conference/workshop the day prior to Congress, with an emphasis on career oriented workshops and networking opportunities,
- better networking opportunities – especially for student and early career attendees,
- better visibility and value for exhibitors,
- better visibility for poster sessions,
- including a job fair with a diverse range of organizations,
- more diverse expert presenters, including traditional and Indigenous knowledge holders,
- coming up with a more fun and engaging alternative to the banquet,
- spreading out the award presentations so they are not given out all at once in a lengthy ceremony,
- having engaging speakers on more timely and interesting topics,
- making the PICO–F French language event (2023 Congress) a recurring Congress event, and offering funding for additional French language activities,
- being more mindful of language difficulties, with one interviewee noting “CMOS had a comedian at Congress one time, and that was awful because they spoke too quickly and it was hard to keep up”,
- providing more travel bursaries for early-career professionals,
- ensuring volunteer time commitments are not overly onerous, and
- including a fun icebreaker event (like Congress 2023) as a recurring Congress event.

### *In-Person, Hybrid, and Virtual Formats*

There is a mixed response to the plan of alternating the Congress from in-person/hybrid to fully virtual each year. The virtual option improves accessibility, especially for those without employer funding for conference travel, like many government employees. However, many feel the most valuable aspect of Congress is the ability to directly engage and network with

other students and professionals – something that most feel can not be accomplished virtually. Feedback from the 2023 Congress suggested there is still significant room for improvement in the virtual experience. Further, academic supervisors note the student experience of presenting virtually is insufficient, and that by only offering in-person Congress every two years, many graduate students will lose out on the valuable opportunity to present in-person.

Of note, the American Geophysical Union 2022 annual conference was almost entirely offered in a hybrid in-person/live virtual format. However, data showed the majority of virtual attendees did not attend virtual sessions live, but instead were accessing recordings at a later time. As a result, the AGU decided to only offer the live hybrid format for large focal sessions, such as plenaries, for future meetings, opting to simply record and later make available online the bulk of the smaller sessions. CMOS should track similar virtual attendance statistics at the next hybrid Congress to evaluate if it should consider a similar path.

**At the 2020 AGU Annual Meeting, the majority of virtual attendees did not attend virtual events live, but instead accessed recordings at a later time.**

### *Event Partnerships*

Other scientific societies noted the significant benefits of running an annual conference in partnership with another event, like the CMOS Congress / ORCA National Meeting in 2023. This increases exposure, potentially brings in new members, broadens networking opportunities for attendees, and for those with interest in both events, significantly increases the value proposition of attending. Joint sessions and other integrated programming between the two events is a way to grow these impacts across the board.

### **Centre Events**

CMOS Centres serve as local hubs for members to gather, primarily for social and learning related activities. Knowledge exchange activities focus primarily on hosting scientific presentations and seminars on discipline-specific topics. The activity level of Centres varies widely. In 2022, Centres ran an average of two knowledge exchange events a year, with only three of the thirteen Centres running three or more events: Vancouver Island, Toronto, and Ottawa.

There is a general preference for concise talks and seminars on engaging topics, particularly when scheduled at convenient times and a recording is made available online afterwards. Centre events are typically free for members and non-members alike. Attendance statistics and feedback surveys are not standardized across Centres, or in Centre Annual Reports, making it difficult to assess the collective reach and impact of these activities.

### *In-Person Events*

Attendance at in-person events typically hinges on three key factors: time availability, proximity to the event location, and interest in the presentation topic. Retirees are especially active in attending Centre in-person events, as are students when events are held in or near universities. Some place high value on the ability to congregate in person, especially from a networking perspective.

### *Virtual Events*

Centres are increasingly offering at least some of their scientific events in a hybrid or fully virtual format. The ability to access content online, especially recordings made available afterwards, is appreciated by many – especially working professionals and parents with young children. For instance, a recent virtual seminar hosted by the Ottawa Center attracted 40 live attendees and garnered 99 views of the recording within three weeks following the event.

### *Centre Event Visibility & Promotion*

Centres primarily promote their events through e-mails to Centre membership, and when applicable, by posting on Centre social media channels. CMOS National promotes virtual Centre events to the entire membership by posting event information on the CMOS website and social media, and in some cases, distributing membership-wide emails promoting the events. Event recordings are typically made publicly available through the CMOS YouTube page. Despite these efforts, most of those interviewed were unaware of their Centre activities.

### *CMOS Speaker Tour*

The CMOS Speaker Tour is organized by CMOS National and the School and Public Education Committee (SPEC), and hosted by Centres. Centres widely appreciated this initiative, and noted it serves as the only scientific event for a number of Centres with low activity levels. It also underscores the efficacy of organizing events at the national level that are facilitated through the Centres. However, statistics and demographics for attendees are not consistently tracked over time, making it difficult to assess the reach and collective impact of this activity.

## Special Events: Facilitating discussion on key issues

There is wide consensus that CMOS should be convening experts for facilitated discussions on specific challenges and issues of scientific or societal importance. These special events and discussions are seen as opportunities to improve coordination, build consensus, and spur collaboration – and in some cases could culminate with a white paper or position statement. One interviewee commented “these events should not be looked at as mini-Congresses for showcasing research, but as gatherings with a specific goal, like gaining input for a position paper or hosting forums for discussion on topical issues.”

“These events should not be looked at as mini-Congresses for showcasing research, but as gatherings with a specific goal, like gaining input for a position paper...”

### *Topic / Issue Selection*

Interviews expressed an interest in a mechanism that would allow members to suggest or recommend special events and projects on specific topics and issues. One suggested model used by the US Climate Variability and Predictability Program (US CLIVAR), which issues funding calls for special events to solicit proposals from the community.

A selection of suggested event topics include:

- data visibility, accessibility, interoperability and management,
- meteorologic service delivery and collaboration across the Canadian weather enterprise,
- marine carbon dioxide removal,
- artificial intelligence, machine learning, and operational meteorology,
- climate research priorities, and
- workforce development in atmospheric science.

### *Government Attendance*

Government managers noted it is often easier for them to approve registration and travel costs for smaller, more specialized scientific events than for large, multi-topic conferences.

### *Partnerships*

Hosting special events in partnership with other organizations helps increase visibility, reach and impact, while also spreading the organizational and financial load. Some special event topics may also generate interest from financial sponsors or funding partners.

## Committees and Special Interest Groups

Special Interest Groups (SIGs) and some committees help facilitate networking, collaboration and knowledge exchange around specific topics and issues. This is largely through their own Committee and SIG Advisory Board meetings. Interviewees in particular noted:

- The Student Committee recently launched a student and early career Slack Channel, and occasionally hosts events for their membership, including career-related webinars and special activities at Congress.
- The Atmosphere-Related Research in Canadian Universities (ARRCU) SIG listserv is valued by its members.
- The recently revitalized Private Sector Committee has hosted several webinars and created an advisory sub-committee between the Meteorological Services of Canada and the private sector/academia to improve collaboration across the weather enterprise. One committee member also recommended CMOS help support presentations on how to engage government, or pathways to engage with groups like the Ocean Supercluster, Innovation Solutions Canada, and the Industrial Research Assistant Program (NRC).

A small but passionate number of those interviewed expressed interest in CMOS playing a larger role in international scientific discussions, and in working with countries in need of scientific expertise and support – especially in respect to meteorology and extreme events. A committee or SIG may be a good avenue to facilitate these efforts.

There is certainly room to grow the impact of most Committees and SIGs, especially through the organization of presentations and meetings on specific topics and issues. There is a clear challenge with visibility and volunteer capacity of these entities, with many interviewees reporting a lack of awareness of these groups. Of note, few committees or SIGs were mentioned in the CMOS Implementation Plan, and only one SIG and three committees included plans for the upcoming year in their 2022 annual review.

## Scientific Journal *Atmosphere & Ocean*

There are mixed views on the CMOS scientific journal, *Atmosphere and Ocean* (A&O). Some, especially retirees and those in government, feel it fills a need for Canadian content in these fields, and said they occasionally read journal content. Others had strong negative opinions, raising concerns about low impact factor, poor quality of submissions, and the high number of international submissions. One interviewee commented “you’re not getting tenure if you’re publishing in A&O.” Interviewees noted A&O’s Canadian scope is what makes it distinctive.

### *Publication Readership & Access*

Readership of A&O is mostly Canadian, and skews towards government. Increasingly, new

research is not consumed by reading a specific journal cover to cover. Interviewees are more regularly accessing new research through other channels such as Research Gate, RSS feeds, Google Scholar alerts, and communications from other organizations.

### *Publishing Experience*

Most individuals interviewed for the project have not published in *A&O*. Two interviewees published in *A&O* before, but will not publish in it again because the process took too long, was too expensive, and/or the publisher was not responsive in a timely or effective way. One also related a frustrating experience trying to split open access for their article. The relatively high expense of publishing in *A&O*, especially for open-access content, was frequently noted.

### *Publisher: Francis & Taylor*

The few interviewees who have had interactions with the journal publisher, Francis & Taylor, expressed frustration with them, commonly citing issues with poor communication and slow turn around times on submissions. The CMOS Executive Director and Publications Director met with the publishers in early 2024 to discuss these and other issues as part of conversation around contract renewal with the publisher. The Executive Director felt it was a productive meeting that helped identify that many of the issues were actually from the CMOS end of the publications process. He is satisfied to continue publishing with *A&O*.

### *Suggestions for Improvement*

Although a few see *A&O* as obsolete and no longer needed, most interviewees expressed clear interest in revitalizing the journal, but had little consensus as the best way to accomplish this. Suggestions included:

- reviewing and revising the editorial structure,
- hiring a paid Publications Director,
- switching to a different publisher,
- streamlining the review process,
- increasing the visibility of *A&O* and *A&O* articles,
- creating more special issues with guest editors,
- providing publishing discounts to CMOS members,
- meeting with ECCC and DFO to encourage their staff to publish in *A&O*,
- providing free or discounted online journal access to members of partner scientific societies, and asking these societies to highlight this benefit, and
- having shorter term contract lengths with the publisher (one year instead of five)

Most interviewees expressed clear interest in revitalizing the journal, but had little consensus on the best way to accomplish this.

# Communications

Communications is one of the most important areas of operational capacity for a scientific society, second only to core executive and financial administration. Communications is crucial for increasing the visibility and reach of the Society and its activities, and heavily influences member and external perceptions of the organization's reputation and credibility. Almost every area of CMOS activity would benefit from strategic communications support.

Almost every area of CMOS activity would benefit from strategic communications support.

## **Responsibility**

CMOS lacks internal expertise and capacity for organization communications, leading to a lack of cohesion and a fragmented, largely ad hoc approach to communications that are largely perceived as unprofessional and contributing to perceptions of CMOS as an out of touch organization. No single individual or entity is responsible for CMOS communications. Those staff and volunteers currently involved in these areas are doing their best, but are hamstrung by lack of expertise, strategic direction, and time availability.

## **Website**

Websites are one of the most public faces of a scientific society, and are influential in perceptions around organizational reputation and activity level – especially among non-members and external organizations. They play an important role in communicating a society's goals, governance/structure, and areas of work. They are also the primary interface for those wishing to access online resources and/or learn about society membership and volunteer entities.

Websites should contain information about news, events, initiatives, and opportunities of relevance to their members. However, it is important to note CMOS members do not often pro-actively visit society website in search of this information, preferring instead to receive this information through e-newsletters.

### *Analytics*

The CMOS website is not set up with analytics. As a result, statistics on its use are not available, making it difficult to ascertain the reach and usage trends of the site.

### *Look and Format*

The CMOS website is widely regarded as out dated, with many interviewees expressing a desire to see it overhauled into a more modern look and format. Of note, few interviewees commented on website content, placing far more emphasis on the look and feel of the site.

## Content

The CMOS website contains information largely in line with other small scientific societies. CMOS website pages managed by CMOS staff are kept relatively up to date. Pages managed by volunteer entities like Centres and Committees have greater variation in the quality and timeliness of the content. There is not a formal mechanism in place to review volunteer managed content to assess if/when pages should be modified or taken down in the event a committee, Centre or Special Interest Group goes dormant for an extended period.

## Job Board

There is high demand for a highly visible and well populated job board to post job openings and opportunities for graduate and post-doctoral research. Very few of those expressing this need were aware of the existing CMOS job board, which is maintained by CMOS staff. Those already aware of the CMOS job board felt it was not visible enough to generate impact, and suggested CMOS better promote it and start pro-actively seeking positions and opportunities to better populate the board.

The American Geophysical Union (AGU) subscribes to a paid job board service offered by their publisher, Wiley, which requires virtually no input from AGU staff. It has been extraordinarily popular with their members.

## The Bulletin

*The Bulletin* is frequently cited as the type of communication CMOS should be doing more of. Originally established in 1967 as a bi-monthly magazine providing plain language articles about interesting news, events, and research, it transitioned to a fully online format in 2017. A paid, external editor is responsible for managing content for *The Bulletin*.

Although *The Bulletin* is generally appreciated, some noted disappointment that articles “trickle out slowly”, rather than being circulating as a full issue with numerous articles and content at once. Others felt *The Bulletin* should be combined with *The Wave*, to create a more frequent e-newsletter featuring interesting stories and content, as well as information about upcoming events, funding opportunities, training opportunities, etc. *The Bulletin* was also suggested as a good outlet to feature profiles on early career and mid career professionals, which is perceived as valuable to their career.

## Distribution and Reach

Initially, *The Bulletin* was distributed using an e-mail list managed internally by CMOS staff. However, in the last few years it was transitioned to a platform requiring interested members to opt-in to the e-mail distribution list. This dropped the distribution list down from approximately 1,000 individuals to approximately 800. A surprising number of those interviewed mentioned they used to enjoy *The Bulletin*, but hadn't received it in a few years – clearly unaware of the need to opt-in.

## *Analytics*

Analytics from *The Bulletin* show an increasing trend in online readership, with a nearly 50% increase in online readers between 2018 and 2021 (data from 2022 was not provided in the 2022 Annual Review). There is also an increasing trend in online readers from outside of Canada, and a significant increase in the amount of online visitors arriving from organic searches, as compared to direct marketing or social media.

## **The Wave / CMOS E-Newsletter**

There is high demand for CMOS to create a regular e-newsletter featuring relevant and timely news and stories, including information about developments in the field, significant publications, relevant policy developments, and pertinent upcoming events, funding opportunities, job postings, and training initiatives. Content should be easy to scan, with links to full articles as compared to including lengthy text. Interviewees felt an e-newsletter could help amplify voices within its community by promoting recent publications and highlighting key takeaways from relevant articles. There is also a clear desire for information not just about CMOS events and opportunities, but also about those from other organizations relevant to the atmospheric and oceanographic community.

Interviewees noted they do not typically check the CMOS website to learn about CMOS events and opportunities, expressing a strong preference for receiving this information via e-mail. Others expressed interest in a way for members to easily submit content to include in the e-newsletter, or to also consider creating a CMOS listserv. The Cryolist was pointed to as a good example of an effective listserv.

*The Wave* is seen as a start to developing the desired type of e-newsletter, and is generally appreciated by those who receive it. There is strong consensus *The Wave* needs to become more professional in its production quality, be distributed more frequently, and should start including content described in the previous paragraphs. One interviewee noted "I get more useful information and updates from the ARRCU listserv than I do from CMOS."

Analytics for *The Wave* were not available to quantify reach or evaluate usage trends over time.

## **Social Media**

Social media is increasingly important for organizations to raise their profile and reach. However, to be most effective, social media requires a strategic approach with frequent and well curated content. There are a growing number of tools available to make it easier to manage an organization's social media activity. CMOS does not have a coordinated approach or strategy for social media, and postings to social media are ad hoc and infrequent.

### CMOS Social Media Channels

CMOS National has social media channels on Facebook (475 followers\*), Twitter / X (886 followers\*), and LinkedIn (331 followers\*). The Halifax Centre has a Facebook page (39 followers\*) and a Twitter / X account (68 followers\*). The Ottawa Centre has a Facebook page (256 followers\*). Although the number of followers to these channels is low, it is not insubstantial in comparison to current CMOS membership numbers (770 as of January, 2024). It is unclear what percentage of CMOS social media followers are current or former CMOS members, or what sector/stage of career they are drawn from. Of note, eight CMOS Centres have a Facebook link on their Centre webpage that dead end.

\* follower numbers as of March, 2024

Although most interviewees felt CMOS needs a stronger social media presence, very few said they would engage with CMOS social media themselves.

### Stakeholder Social Media Preferences

Interviewees showed a strong preference for keeping their personal and professional lives separate on social media. They often limit their professional engagement to LinkedIn, while centering their other social media channels around their personal lives.

Although most interviewees felt CMOS needs a stronger social media presence, very few said they themselves would engage with CMOS through social media. Exceptions to this include:

- *LinkedIn*: students, early career and mid career professionals in particular felt they would benefit from more CMOS content on LinkedIn, especially in relation to career-focused content.
- *Twitter / X*: several meteorologists (especially mid-career professionals in operational meteorology) said they find Twitter/X useful for real time weather updates.

The Student Committee recently launched a Slack channel in an effort to better facilitate communication among students and early career professionals. It is too soon to assess if this will be a useful pathway for this segment. Of note, a link to this channel is not available through the CMOS website.

### Media Engagement

Media presence is an important way to raise the visibility of an organization. For scientific societies, media engagement should be a two way street, where the Society can reach out to media to promote public events, scientific developments or position statements of relevance to society at large, and where media can connect with the Society when in need of information and comment on scientific issues.

Interviewees and survey respondents expressed strong interest in CMOS improving its visibility, growing its scientific voice, and becoming more active in improving public understanding of weather, water, climate and environment. Media engagement was frequently pointed to as an important pathway to advance these priorities.

The Canadian media landscape is relatively small, with only a few dedicated science journalists at the major media outlets. Developing and maintaining relationships with these journalists is critical to grow the visibility and impact of CMOS position statements and other scientific commentary of relevance to Canadians. Media engagement in support of driving attendance for public events is best handled through public service announcements and press releases to local media outlets.

### *Current Media Approach*

CMOS does not have a coordinated approach or strategy for media engagement. The CMOS By-Laws assign responsibility to the President to speak on behalf of the Society “on all occasions of major import”, but does not specify if this extends to media. CMOS does not have a history of pro-actively reaching out to media, with the exception of ad-hoc media connections made by CMOS volunteers in leadership roles, or in connection with the Congress.

### *Connecting Media to Experts*

CMOS is sometimes contacted by the media to ask for professional insight on a scientific topic or issue. CMOS staff then direct them to an appropriate person within the membership, although this is typically one of a handful of people who had previously let CMOS staff know they are interested in speaking to the media. One interviewee noted a frustration with this approach, suggesting it would be better to provide media opportunities to a larger number of members – especially early career professionals and those from equity-deserving groups.

CMOS hosts a “Find an Expert” service through the CMOS website, which is meant to serve, in part, as a mechanism for members of the media to find experts directly. However, this feature is somewhat hidden on the website, and the functionality for finding a scientist is currently unavailable (functionality for finding an accredited consultant, endorsed weathercaster, or someone within the private sector directory remains available).

## **Other Communications**

Outside of the aforementioned communication channels, CMOS communicates on a more ad hoc basis through other avenues such as e-mails, e-newsletters, and listservs from CMOS volunteer entities. There is also a significant level of communication activity related to the Congress. These activities are run independently from CMOS National, and do not have a mechanism for coordination or to ensure consistency in CMOS branding. CMOS has not been effective in leveraging its relationships with other organizations, such as the Oceans Research in Canada Alliance, to help promote CMOS activities and events.

# Workforce Development

Workforce development emerged as a strong theme through this project, supported by a number of trends and findings:

## Volunteers

Interviewees who have been substantially involved as a volunteer frequently cited their volunteer experience as the greatest benefit to their CMOS membership. Student and early to mid career volunteers in particular noted the meaningful impact their volunteer engagement had on growing their professional network and developing their leadership and professional skills and experience. The general feeling was that “you get out of CMOS what you put into it.” In contrast, volunteers with relatively small or short term roles in CMOS, such as one time volunteers for events, felt they had little benefit from their involvement. Encouraging members to recognize the professional development value of meaningfully engaging as a volunteer may help draw more volunteers to the table, and grow the number of individuals benefiting from this activity.

Student volunteers in high engagement roles, and to a lesser extent early career professionals, expressed interest in receiving more guidance and direction in their volunteer roles. Offering opportunities like leadership training and mentorship to those on the Student Committee and Centre student representatives, for example, would be well received by this segment.

Of note, several of those interviewed and surveyed mentioned an interest in volunteering or becoming engaged, but were unsure of how to learn about these opportunities.

## University Students

Students clearly and consistently identified content and activities related to career exposure, networking and professional development as top priorities. This trend has emerged across other scientific societies as well, to the point that supporting career and/or workforce development is a strategic priority for many scientific societies.

### *Career Exposure Resources*

There is high interest among students, and some early career professionals, for CMOS to provide resources and activities related to potential career paths. Many are unsure of what types of careers

Students clearly and consistently identified content and activities related to career exposure, networking and professional development as top priorities.

they could pursue given their areas of study, especially in relation to the private sector. Others are seeking information about specific skills or areas of study that are in particularly high demand, or that are necessary for specific jobs. The Student Committee has hosted a number of successful career oriented webinars, however additional support to help with visibility, sustained momentum and organizational capacity would help grow their ability to facilitate more of this type of content.

### *Mentoring*

There is student interest in mentoring opportunities, but when asked about the American Geophysical Union (AGU) mentoring program CMOS has engaged with, the feeling was this is a more onerous pathway for mentoring than ideal. Some also mentioned a lack of relevant Canadian mentors in this system. A more concerted effort to recruit Canadian experts to join this network as mentors, and better visibility within CMOS about this resource, is needed. Alternately, exploring a different format, like that used by the Canadian Water Resources Alliance (CWRA), may also be worth considering.

## **Scholarships, Awards and Professional Recognition**

Students, and early to mid career professionals especially value access to scholarships, awards and/or professional recognition. Key findings include:

Leaders in ECCC, DFO and DND all expressed interest in potentially partnering with CMOS on youth career exposure programming and/or activities in support of equity-deserving youth.

- Financial scholarships and awards are important to students, although there is a significant gap in awareness about these opportunities. Assigning scholarships a higher dollar value, removing NSERC top up requirements, and better promoting the opportunities was encouraged by students.
- Early career and mid-career professionals expressed interest in awards and professional opportunities, such as profiles in *The Bulletin* or key presentation slots at Congress, that would help advance their recognition and career. Of note, the American Geophysical Union recently introduced awards specifically targeting mid-career professionals that have been helpful in engaging this segment.
- Several interviewees recommended CMOS offer scholarships and awards specifically to equity-deserving youth, students and professionals.
- Early career professionals would benefit from additional travel bursaries and financial awards to reduce the financial burden of attending Congress.
- One private sector technology company expressed interest in creating an award in its name that would prize equipment/services from their company, and suggested this might appeal to other private sector companies as well.

## **Student & Employee Recruitment**

Academic programs in the atmospheric sciences (including meteorology) are experiencing low enrollment rates, and are increasingly struggling to keep relevant courses and programs on offer. Academic researchers note challenges in recruiting qualified graduate students – especially those with strong math and physics backgrounds. In parallel, employers are having difficulty filling atmospheric science related positions. In addition, a lack of diversity and representation remains problematic across the atmospheric and oceanographic landscape.

Interviewees relating to these issues made a variety of suggestions on how CMOS could help address these challenges, including:

- increase the level of CMOS youth outreach and engagement, especially among equity-deserving youth, with an emphasis on providing exposure to careers and fields of study in CMOS disciplines,
- increase the visibility of advanced degrees and careers in the atmospheric and oceanographic sciences among undergraduate students, with an emphasis on those in math, physics and computer science programs,
- consider working with DND and other partners to develop an operational meteorology certificate program to help address challenges DND is experiencing with low enrollment in their meteorology technician training program,
- provide more scholarship opportunities for high school youth interested in entering post-secondary education programs in CMOS disciplines, with an emphasis on those from equity-deserving groups.
- provide a high visibility and well populated job board, inclusive of masters and post-doctoral opportunities.

## **Training & Professional Development**

Students expressed interest in professional development training in general, but with little consensus on specific topics other than career exposure. Working professionals frequently identified the specific need for training on new technologies and building technical capacity across the board. One interviewee suggested CMOS consider running a technical summer school through the NSERC Create program.

## **Professional Accreditations and Endorsements**

The CMOS Accreditation Committee and Weathercaster Endorsement Committee manages the review and provision of CMOS professional designations. These committees meet infrequently, and only in response to applications for accreditation or endorsement.

There was mixed feedback on the need for CMOS professional accreditations and endorsements. There is wide consensus that these designations are poorly known, and without legal standing behind them, they do not have much weight or value in the

professional context. Some suggested this was rationale for discontinuing the designations altogether. Others felt these designations were needed now more than ever, and that CMOS should be putting in a concerted effort to raise their visibility, and to restart the conversation with government around their legal standing. Some also noted the need for new designations, especially in relation to climate. Other insights of note:

- Between 2018 to 2022, one accreditation was approved, and no weathercaster endorsements were approved (although one application was received).
- Responsibility for promoting CMOS accreditation and endorsement opportunities is not included in the committees terms of reference, contributing to issues with visibility and awareness of these designations.
- One academic interviewee suggested creating a university program accreditation (similar to that offered in chemistry) as a way of helping to protect the integrity of university programs in atmospheric science.
- The American Meteorological Society recently introduced a Certified Digital Meteorologist designation. The Royal Meteorological Service is interested in developing a climate professional designation, and is open to possibly collaborating with CMOS on this to establish an international designation.
- The relatively new Canadian Association of Professionals in Climate Change (CAPCC) is interested in creating a professional climate accreditation, although its unclear where this process stands. Given the clear intersection of scientific interests between CMOS and the CAPCC, work to better coordinate the activities of both organizations to avoid duplication of efforts is needed. Of note, the only person to mention the CAPCC in project interviews was an individual involved in its leadership, suggesting the CAPCC is still in the early stages of its growth.

# Outreach & Youth Engagement

*NOTE: Insights on CMOS work related to scientific talks and lectures targeting CMOS members and/or the scientific community is discussed in the knowledge mobilization section of this report (page 39). This section is focused on activities with an external, non-scientific target audience.*

Interviewees and survey respondents, especially students and retirees, feel CMOS should do more to improve public understanding of weather, water, climate and environment. Three primary pathways were most commonly pointed to:

- more engagement with the media (see page 50),
- more position statements and other formal scientific commentary (see page 37), and
- more public outreach, with an emphasis on youth engagement.

## *Youth Engagement*

Youth engagement was most frequently mentioned in relation to the growing need for more students and qualified employees in CMOS disciplines, especially meteorology and atmospheric science. Some also mentioned the important role of youth engagement in addressing the lack of diversity and representation in the Canadian weather, water and climate enterprise. In both cases, there was a clear desire for youth outreach with a career exposure focus. Of note, leaders within both DFO, ECCC and DND expressed interest in potentially partnering with CMOS on these types of activities.

## *Other Public Outreach*

Feedback on broader public outreach centered primarily on improving public understanding and acceptance of climate change science (especially in relation to mis-information), and educating the public weather and climate risk and preparedness.

## **Strategic Priorities**

The 2021 – 2024 CMOS strategic plan includes “increase the scope of the Society’s efforts in education and outreach, including the promotion of equity, diversity, and inclusivity” as one of the three overarching priorities for the Society, indicating strong interest from CMOS National to prioritize this work. Specific implementation targets for the priority are outlined in the 2022 – 2023 implementation plan.

## **School and Public Education Committee (SPEC)**

Outreach and public engagement activities on behalf of CMOS National are led and coordinated by the School and Public Education Committee (SPEC). The SPEC appears to be one of the most active CMOS committees, and has been especially effective at developing partnerships to advance strategic implementation targets. SPEC also contributes to the CMOS Speaker Tour (see page 43). Key activities include:

- participating in teachers conference workshops in collaboration with Project WET,
- collaboration with Project WET, the Canadian Water Resources Association (CWRA) and the Black Environmental Initiative to adapt/create Project WET resources with an emphasis on climate and environmental justice,
- promoting and supporting the inclusion of Canadian teachers in the American Meteorological Society teacher training programs Project Atmosphere and Project Ocean,
- partnering with the Community Collaborative Rain–Hail–Snow around the purchase and distribution of precipitation measurement kits,
- partnering with the American Geophysical Union to make their Mentoring365 platform available to CMOS members, and
- maintaining a list of K–12 educational resources on the CMOS website.

Despite the activity of the SPEC, there remains a visibility issue of its work among CMOS members and target audiences, with one committee member stating “its hard to get people engaged in these things.” The success and impact of the SPEC is largely derived from the strength of its leadership and the dedication of its members, especially that of a handful of particularly motivated volunteers.

## **CMOS Congress**

Organizers of the CMOS Congress, typically in collaboration with the SPEC, often include public and/or youth engagement activities in parallel with the Congress. One SPEC member noted a previous effort to host teacher training events aside the Congress, but that the timing of the Congress made it difficult for teachers to attend. The 2023 Congress mobilized funding support through a Genesis grant to support a public panel event on extreme weather, and a youth engagement workshop for several local school classes. These events were well attended and received positive feedback from attendees and CMOS members alike. Some interviewees felt CMOS should make a youth engagement initiative and a public engagement talk become standing, recurring events for future in-person Congresses. Exploring a way to train volunteers on standardized youth educational programming, like Project WET, may be a way to reduce the burden of running youth events at each Congress.

## **Centre Outreach Activities**

Aside from science fairs and hosting the CMOS Speaker Tour, Centre outreach activities are largely ad hoc and usually championed by an individual volunteer with interest in this area. As a result, outreach activity levels and areas of focus typically wax and wane based on the interest and turnover of volunteers. There is not a formal mechanism for coordinating or reporting Centre outreach activities with the SPEC or CMOS National, although the Membership and Centre Chairs Committee is often used as a forum to share updates on these and other Centre activities. Information about Centre outreach activities is not often shared with membership, contributing to visibility issues.

### *Science Fair Judging and Awards*

Six of the thirteen Centres reported contributing to their local youth science fairs in 2022, although two noted they typically engage in this activity, but were unable to in 2022 (data not yet available for 2023). Most simply provide funding for an award to the Science Fair organizers. Few send representatives to serve as volunteer judges. There appears to be no further engagement with the prize winners once the award is given.

Surprisingly, across all interviews and survey responses, CMOS involvement in science fairs was only mentioned once, suggesting a lack of visibility of CMOS's work in this area. It is unclear if, and to what extent, members value this activity. It is also unclear if, and to what extent, these awards generate meaningful impact for the winners. CMOS should consider exploring ways to add value to these awards, like inviting winners to tour research facilities, or to shadow a scientist for day.

### *Youth Engagement (Centres)*

Specific Centre youth engagement activities of note include:

- The Halifax Centre has recently put a focus on EDIA, offering a new scholarship and collaborating with local BIPOC-focused youth organizations.
- The BC Interior and Saskatchewan Centres have both provided weather stations to local schools and libraries, and occasionally service or repair the stations.
- The Toronto Centre mentioned a "CMOS Educational Program" they delivered virtually, presumably to youth although this was not specified. Prior to the pandemic, the Toronto Centre was very active in giving presentations to schools and other organizations.

Centre youth engagement activities appear most successful when developed and/or delivered in partnership with youth-serving organizations.

Across the board, Centre youth engagement activities appear most successful when developed and/or delivered in partnership with youth-serving organizations. Without metrics and participant feedback mechanisms, it is difficult to ascertain the full extent of the impact these activities are having.

# Centres

Centres serve as hubs for members to convene locally for social, learning, knowledge exchange, and – in some Centres – public outreach and engagement activities. They are led by Centre Councils, that although required to include a Chair and Treasurer, sometimes include additional roles such a student or communications representative. CMOS members are assigned to a Centre based on their geographic location, and CMOS National provides Centre leadership with up to date Centre email lists roughly twice a year. The engagement and activity levels of the current 13 Centres varies widely, with some holding regular meetings and putting out regular communications, while others are largely dormant. Related findings include:

## Strategic Planning & Annual Reporting

Centres do not have a formal strategic planning mechanism to establish long term objectives or annual goals and targets. They provide an annual report on their activities, articulating the year’s Council members, activities, and financial report.

- Two Centres (Newfoundland and Rimouski) did not submit a 2019, 2020, 2021 or 2022 year end report at all.
- At least two Centres (BC Lower Mainland and New Brunswick) appear to consistently run no activities beyond supporting science fairs and sometimes hosting the CMOS speaker tour.
- Only two Centres articulated their planned activities for the coming year in their 2022 annual reports.
- Data and metrics that help assess performance, impact and reach (membership numbers, attendance numbers, social media engagement, etc.) are notably absent from Centre annual reports.
- The 2022 Centre activity level shown at right is comparable to the Centre activity level in 2019, suggesting a return to pre-Covid activity levels.

## 2022 Centre Activities\*

\* as reported in the 2022 CMOS Annual Review

22 Talks or Seminars\*

\*10 from just two Centres. This excludes the CMOS speaker tour.

6 Centres contributed and/or engaged with youth science fairs

5 Centres engaged in some form of community outreach and/or gave scholarships

2 Centres provided regular regional weather or climate summaries

## **Awareness & Recruitment**

Most members interviewed were unaware of the activities and benefits of their local Centres. In parallel, efforts to improve visibility and membership are almost never mentioned in Centre Annual Reports (2018 – 2022).

Centres almost never report on their membership recruitment efforts, making it hard to know what, if any, recruitment efforts are underway.

## **Centre By-Laws**

CMOS by-laws around Centres should be updated to reflect the modern reality of the Centres (e.g. include atmospheric science) and to provide them with more flexibility (e.g. the ability to advance their own projects and outreach initiatives).

## **Weather & Climate Summaries**

Several interviewees and surveyed members mentioned their appreciation of regional weather and climate summaries often distributed by Centres, finding them of value.

## **Knowledge Mobilization, Networking, Collaboration & Outreach Activities**

Centre activities in these areas are described in the Centre Scientific Events section (page 42), and the Centre Outreach Activities section (page 57) of this report.

## **Student Representatives**

Most Centres strive to include a student representative on their Council. In interviews, students in these roles noted they often were unsure what their responsibility was, and felt they did not make a meaningful contribution to the Centre. Notably, the Halifax Centre now offers a small bursary to their Student Representatives on Council, with the objective of making the role more accessible to students who may have to take time away from paying jobs to fill the position. Centres may also want to consider assigning responsibility to student representatives to promote CMOS and recruit new members at their universities, and support these efforts with a paid stipend.

# Special Interest Groups (SIG)

SIGs are meant to allow members to self-mobilize and convene around specific topics and areas of interest. The CMOS By-Laws state SIGs organize scientific meetings in their areas of interest, assist the Congress Program Chairperson in soliciting papers in the SIGs area of interest, provide advice to Council as needed, and report on their activities via the CMOS *Bulletin* and an Annual Report.

SIGs operate relatively independently from CMOS leadership, with activity levels ebbing and flowing depending on the volunteer leadership involved. The Atmosphere-Related Research in Canadian Universities (ARRCU) is the only currently active SIG. Although building momentum with improving communication among ARRCU members, the SIG has struggled to advance specific projects like public statements and meeting with academic funding decision makers. ARRCU members frequently noted appreciation of the ARRCU listserv, especially when it provides notifications about funding opportunities and job openings. One interviewee noted “I get far more frequent and more useful communication from ARRCU than from CMOS National”. Also of note:

- The Arctic SIG has not reported any activity via the Annual Review since 2019.
- The Aviation SIG has not reported any activity via the Annual Review since 2018, when the Chair reported little success in garnering interest in the SIG over the last few years, and noted he was stepping down as Chair and unable to find a replacement Chair.

Enabling members to self-mobilize around specific topics and issues is a useful way to help CMOS grow its visibility and voice – especially in relation to advising decision makers with respect to policy and funding allocations, and in providing strategic input to Council and Congress Organizers. However its unclear whether such a formalized structure, with such prescriptive activity requirements in the By-Laws, is the best mechanism to achieve this.

# Committees & Working Groups

Committees are either specifically prescribed by the CMOS by-laws (section 14C), or are created by Council as required. Committees have a defined Terms of Reference, and are meant to serve as long term entities. Working groups are a less formal mechanism for advancing projects, and are created for a fixed period of time to complete a specific task. Working groups may be established by Council, Executive Committee, a Committee or an Editorial Board.

Like the Centres and Special Interest Groups, the level of activity of a given committee is largely dependent on the level of leadership and commitment of its Chair and committee members. The most consistently active committees are typically those with a narrow focus on specific, recurring necessary tasks such as the nomination committee, audit committee, and prizes and awards committees. Committees with broader mandates, especially without specific recurring tasks or projects, are the most susceptible to variation in their activity level, and inconsistency in the projects and activities they advance. Committees with notable findings not described elsewhere in the report include:

**The most consistently active committees are those with specific, strategic and/or recurring tasks and activities.**

## **Canadian National Committee for Scientific Committee on Ocean Research (CNC-SCOR)**

This active committee is the Canadian arm of the Scientific Committee on Ocean Research International. Operating more as an independent partner than a committee, CNC-SCOR receives funding from DFO that is administered by CMOS. There is no formal terms of reference in place between CNC-SCOR and CMOS. The committee operates quite independently, although given its interests and reach, it could be a more collaborative partner with CMOS. Given its structure and mandate, CNC-SCOR is likely a better fit to operate as a SIG or a partner, rather than a committee.

## **External Relations Committee**

This committee has not submitted an annual report in at least four years (2019 – 2022), and was not mentioned in the 2018 Annual Review at all. An annual or bi-annual recurring meeting with the current Executive and representatives from the Partnership Group for Science and Engineering (PAGSE) and the Canadian Consortium for Research (CCR) may meet the needs of this group, and serve as a simpler mechanism than a formal committee.

## **Congress Committee**

This committee was established in 2018/19 to improve the planning and execution of the CMOS Congress. It appears to have been inactive since 2019, with no annual reports submitted between 2020 and 2022. There is wide recognition of the need for better mechanisms to improve Congress planning and organization, and to ensure the many tools and lessons learned in previous Congresses are leveraged in future Congresses. Motivating volunteers to contribute to this kind of work – especially where most CMOS volunteers don't have expertise in event planning and organization – is a significant challenge. An outside consultant with expertise in event management for scientific conferences would provide a far more efficient way to advance this more administrative work, allowing the committee to focus more on exploring ways to make the Congress a stronger and more impactful event. Given the strong feedback around the need to improve the Congress, this would likely be a better use of the Committee.

## **Private Sector Committee**

The Private Sector Committee highlighted challenges in effectively mobilizing this group due to diverse needs and interests among participating companies, making it difficult to achieve meaningful collective impact. There appears to be a stronger focus on meteorology related businesses than those connected with other disciplines. CMOS National could help support the committee's goals by connecting them with key contacts – especially within the Meteorological Service of Canada. The service CMOS secured to provide information to subscribing members about new bids and RFPs from the federal government is appreciated by those who are aware of it – although more visibility is needed to grow the number of CMOS subscribers. Notably the last few years have seen the proliferation of institutions and government programs supporting businesses in the blue economy, such as the Ocean Supercluster, the Centre for Ocean Venture and Entrepreneurship (COVE), and the Centre for Ocean Applied Sustainable Technologies (COAST), which may provide resources and partnership opportunities should the committee expand its scope to the ocean sector.

## **Student Committee**

The Student Committee has struggled to effectively engage the student community, with leadership often left with the feeling of "starting from scratch" in identifying activities and initiatives to pursue. Momentum is difficult to sustain due to high turn over, and student volunteers may not have prior experience of sitting on committees to draw inspiration from. Further, there is not a mechanism in place to allow the committee to easily gather input from the student membership. Creating a senior advisory role for this committee, providing the committee with more direction and support from CMOS National, and ensuring strong onboarding and transition processes, could help mitigate some of these issues. The committee should also continue exploring partnerships with the growing number of student and early career initiatives in Canada, such as Early Career Ocean Professionals Canada.

## **University and Professional Education Committee (UPEC)**

After being dormant for four years, the UPEC meet twice in 2022 with the goal of reinvigorating the committee, and ensuring appropriate representatives were involved. University programs in the atmospheric sciences and meteorology are struggling with student enrollment and are increasingly experiencing cuts to their course offerings and programs. In parallel, funding is becoming more scarce as government funding priorities are shifting to the more applied and interdisciplinary sciences. As a result, the UPEC mandate is exceptionally timely and relevant to CMOS members in academia. Given the long gap in activity, this committee may require support from CMOS National to get specific projects off the ground. Of the 22 UPEC committee members in 2022, only two have backgrounds in the ocean sciences, leaving the committee heavily skewed towards meteorology and the atmospheric sciences.

## **Scientific Committee**

The Scientific Committee has been largely focused on awarding scholarships in the last few years. Given the need for strong scientific leadership and direction within the Society, and clear interest of the CMOS community in seeing the Society take a strong role in speaking on behalf of its community, the scope and mandate of this Committee should be reviewed. See pages 37 and 44 for more information about the Scientific Committee.

## **School and Public Education Committee (SPEC)**

This fairly active committee has been doing great work to build capacity in educational organizations through collaborations with partners like Project WET and the Black Environmental Initiative. See sections page 56 for more information about the SPEC.

# Insights from Other Scientific Societies

Interviews with senior leadership from five different scientific societies, including the Chemistry Institute of Canada, American Geophysical Union, Royal Meteorological Society, Canadian Water Resources Association, and American Meteorological Association, revealed a number of trends and commonalities among scientific societies as described below.

## **Governance & Organizational Structure**

- Scientific societies face challenges in effectively supporting and communicating with volunteer entities like committees and student groups, highlighting the need for a shared strategic vision.
- Strong, diverse Boards/Councils play a crucial role in governance, necessitating proper onboarding and understanding of responsibilities. Boards/Councils are commonly comprised, at least in part, of representatives from the Society's volunteer entities, including major committees and local centres.
- Society staff are pivotal in leadership roles, driving partnership development, communications and programming aligned with organizational goals.

## **Strategic Direction**

- Strategic plans guide organizational priorities, emphasizing knowledge exchange, career development, and inclusivity.
- Involving students and early-career professionals in governance fosters future leadership and enhances relevance.
- Expansion into interdisciplinary and applied science domains is vital for membership growth and societal relevance.
- Visibility, including robust media presence, is critical for elevating a society's profile and fostering strategic partnerships.

## **Revenue & Accreditation**

- Primary revenue sources include journal publications and conference registrations, with a growing interest in developing partnership revenue to support member-centric programs and activities.
- Professional accreditation in growing fields, such as climate science, is being considered. The RMetS is interested in collaborating with CMOS, and potentially other scientific societies, to develop international standards and accreditation for climate science that span multiple scientific societies.

## Membership & Value Proposition

- Societies are adapting their value propositions to cater to evolving member needs, with a particular emphasis on career development resources and activities targeting students and early-career professionals.
- Growing interest in improving access to science is challenging scientific societies to reconsider members-only resources and benefits.
- Challenges exist in retaining student members post-graduation, necessitating an understanding of generational differences in membership expectations. Free or discounted membership rates for recent graduates and early career professionals are common, although the impact of these measures remains unclear.
- Engagement with the private sector is slowly increasing, signaling a strategic interest in better collaboration.
- Societies that historically prioritized discovery and fundamental science are working to better include the growing fields of interdisciplinary and applied science in their programming and membership – especially in relation to climate change.

“Expectations from members are different now, depending on the generation. For the younger crowd, it’s a much more transactional relationship than with older generations.”

– Executive Director of a Scientific Society

## Publications

- Societies partner with publishers like Wiley to publish journals, with some exploring open-access models to enhance research accessibility.
- Some publishers offer additional paid services to scientific societies. The AGU is using Wiley’s job board service, which has proven “extraordinarily popular” among AGU members.

## Programming & Initiatives

- Beyond scientific programming, initiatives predominantly focus on professional development, networking, and public engagement.
- Collaboration and partnership on programming with other organizations facilitates program delivery, expands reach, and mobilizes funding.
- Hybrid event experiences aim to balance live and recorded sessions to improve accessibility, but challenges arise in making virtual events engaging.

- The last AGU Annual Meeting was fully hybrid, however most virtual attendees accessed content recordings, rather than streaming live. As a result, the next AGU Meeting will only provide plenary sessions and other key events in a hybrid format, and will simply record and then make available most other sessions.

## Examples of High Impact Programs From Other Scientific Societies

### **Science Outreach Microgrants Program** *AGU*

This program, which awarded microgrants between \$500 – \$5,000 to members for science efforts that touched the public, was so successful the AGU increased funding for the program. Many of the grant recipients have remained engaged with the AGU even after their funded project ended, suggesting this type of program is a good way to spur member engagement.

### **Career Advisory Portal** *AMS*

This online portal connects members to a career advisor, information about potential career pathways, and career-related webinars and resources.

### **CIC Virtual** *CIC*

This virtual platform is used to register for, organize and host webinars. The CIC has two different webinar streams: CIC Talks, and CIC Seminar Series. CIC Talks cover cross-cutting topics and issues of relevance to their membership. The CIC Seminar Series is the platform for CIC Subject Divisions to host their own, discipline specific, online seminar series. Members can sign up for a series to access past presentations and learn about upcoming presentations.

### **Student Conference** *RMetS*

This popular annual conference is structured around networking, and includes career and professional development workshops.

### **Project WET** *CWRA*

As the Canadian branch of Project WET, the CWRA provides water education resources and training to K-12 educators across Canada. CMOS has collaborated with Project WET in the past to help build climate related content into the program.

### **Mid-Career Awards** *AGU*

Awards targeted specifically towards mid-career professionals is helping draw some of this segment back to the AGU.