

Motivation

The coastal regions of the United States, particularly the Gulf of Mexico U.S. States, hold great economic significance but are confronted with substantial challenges due to climate change. This research was conducted to support the establishment of the Framework for Coastal Climate Services (FCCS) by GCOOS and its partners in the Gulf of Mexico States.

Users and Stakeholder Engagement

The Gulf of Mexico Coastal Ocean Observing System (GCOOS) initiated a detailed survey assessing climate service perspectives and requirements among a diverse group from academia, government (both federal and state levels), and the corporate sector. This survey, conducted from October 20 to November 30, 2023, successfully engaged 44 participants. Its primary objective was to identify and prioritize the specific needs and preferences regarding climate services in the Gulf of Mexico. This effort is crucial for developing a targeted Framework for Coastal Climate Services tailored to the unique challenges and opportunities in the Gulf states.

Results From Stakeholder Survey

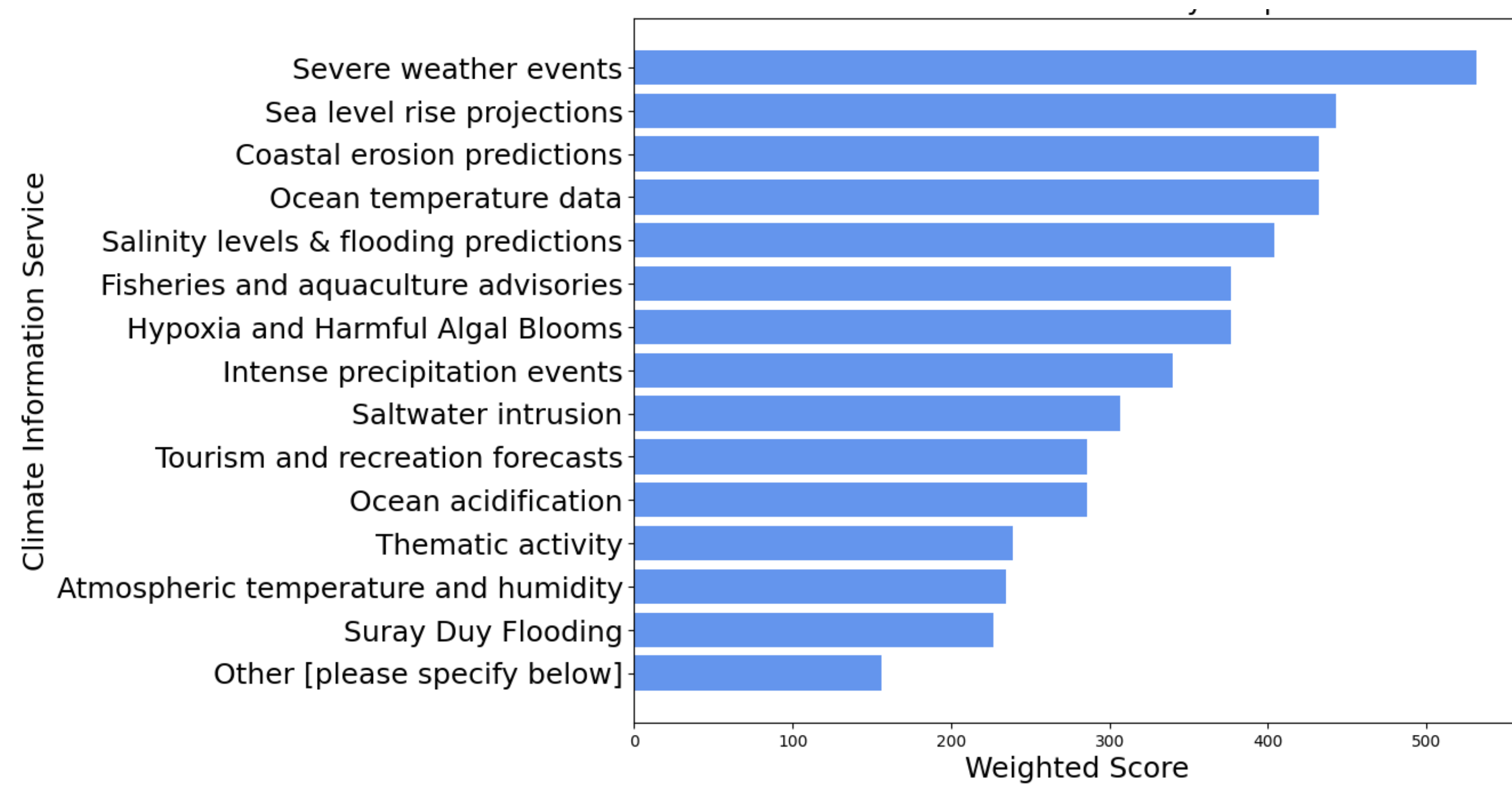


Figure 1 Ranking of climate information services that should be prioritized in the Gulf of Mexico States by respondents. The highest-ranking services, "Severe Weather Events" (532 points) and "Sea Level Rise Projections" (443 points), indicate that respondents view these as the most critical areas for climate planning and preparedness. Other highly prioritized services include "Coastal Erosion Predictions" and "Ocean Temperature Data" (both with 432 points), which reflect concerns about long-term environmental impacts in the region. Lower-ranked services, such as "Tourism and Recreation Forecasts" (286 points) and "Other [please specify below]" (156 points), suggest these are considered less urgent by the respondents, though still relevant.

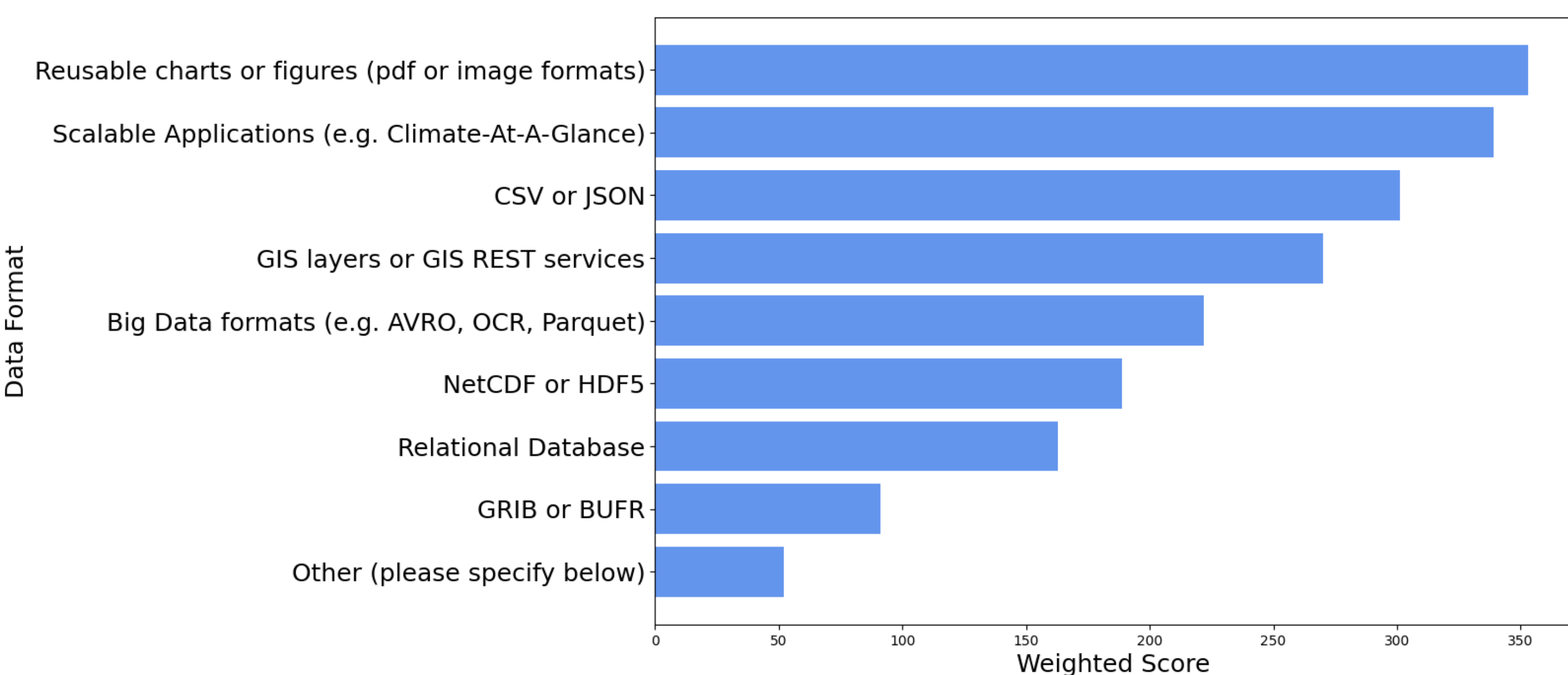


Figure 2 Ranking of data formats preferred for delivering climate information by respondents. This figure presents the results of a survey in which respondents ranked their preferred data formats for receiving climate information. The top-ranked format, "Reusable charts or figures (pdf or image formats)" (353 points), suggests a strong preference for easily shareable and visually interpretable data. "Scalable Applications (e.g. Climate-At-A-Glance)" follows closely with 339 points, indicating the value of interactive and adaptable tools for accessing climate data.

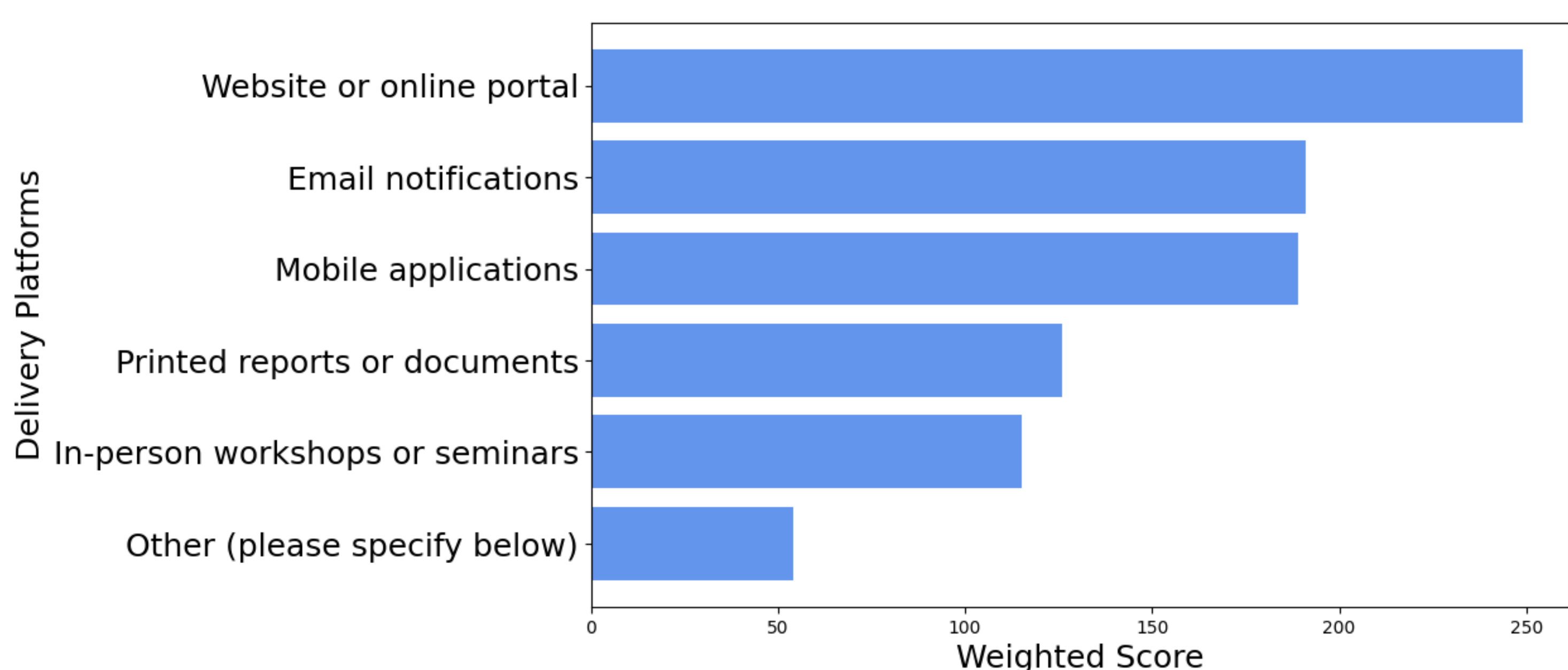


Figure 3 Ranking of platforms for delivery of climate information by respondents. This figure shows the ranking of preferred delivery platforms for climate information based on respondent feedback. The highest-ranked platform, "Website or online portal" (249 points), indicates that respondents favor accessible and comprehensive digital platforms for receiving climate data and updates. "Email notifications" (191 points) follow as the second most preferred method, suggesting that timely and direct communication is also highly valued. However, "In-person workshops or seminars" (115 points) and "Other" (54 points) are ranked lower, indicating that while they have a specific value, they are less favored compared to digital platforms.

GCOOS' Framework for Climate Coastal Services (FCC)

Gulf of Mexico U.S. states are highly vulnerable to the impacts of climate change, including sea-level rise, extreme weather events, and ecosystem degradation.

GCOOS climate services ambitions align with GCOOS's overarching mission of empowering individuals, communities, and businesses to enhance their decision-making processes related to their lives, work, and activities along the Gulf Coast of the United States, as outlined in GCOOS Build-Out Plan Version 2.1., necessitating establishing a Framework for Coastal Climate Services (FCCS).

The FCCS will help identify the challenges and opportunities for climate services in the Gulf of Mexico U.S. States and the role of GCOOS in advancing the whole-of-government endeavor in addressing the climate crisis, bolstering resilience, and fostering socio-economic growth with the Gulf of Mexico region. The FCCS is a living document that will be updated regularly by the GCOOS Climate Services coordinating team and partners to reflect the evolving needs of the Gulf of Mexico U.S. Coastal States.

The Core Principles of GCOOS' FCCS

The Gulf of Mexico Coastal Ocean Observing System's Gulf Coast Ocean Observing System Framework for Climate Services (GCOOS FCCS) is built upon four fundamental principles. GCOOS FCCS's mission to provide meaningful and accessible climate services tailored to the needs of diverse coastal communities.

Table 1 FCCS Principles and Implementation Strategy

Principle	Implementation Strategy
Co-production	GCOOS FCCS emphasizes the importance of co-producing climate services with users to ensure they are relevant, timely, and actionable through promoting active stakeholder engagement and capacity-building initiatives.
Integration	GCOOS FCCS promotes integrating climate services into coastal decision-making processes through coordinating, producing, and delivering climate services and resources needed in land-use planning, infrastructure development, emergency preparedness, Sustainable Coastal Management, and Climate Adaptation and Resilience Planning.
Resilience	GCOOS FCCS aims to enhance coastal resilience to climate variability by coordinating, producing, and delivering climate services that support developing and implementing adaptation strategies.
Equity	GCOOS FCCS is committed to ensuring equitable access to climate services for all Gulf of Mexico U.S. States communities. GCOOS FCCS will promote partnerships with underrepresented and tribal communities to provide resources and training to support their use of climate information to promote equitable distribution of risk and resilience.

GCOOS' Framework for Coastal Climate Services

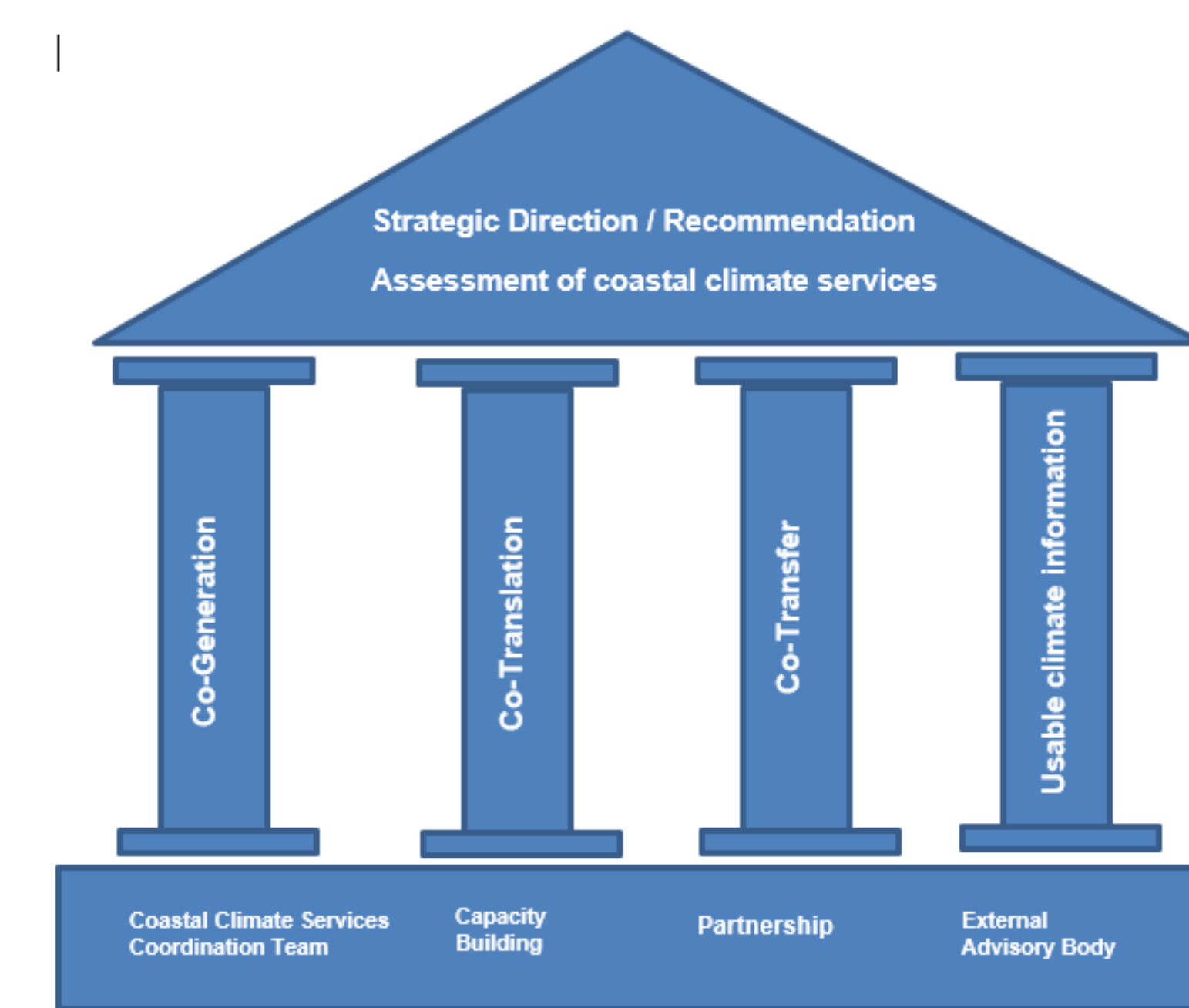


Figure 4 GCOOS's Framework for Coastal Climate Services.

Drawing from the WMO's Global Framework for Climate Services and the US Federal Framework and Action Plan for Climate Services, the components of GCOOS FCCS are:

- The four pillars of GCOOS FCCS
- Coastal Climate Services Coordination Team
- Coastal Climate Services (CS) Partnerships programs
- CSS Capacity Building programs
- The External Advisory Committee
- The Strategic Directions for the Coastal Framework for Climate Services,
- The Annual Evaluation of the climate services provided to the Gulf of Mexico U.S. States.

Conclusion

The Global Framework for Climate Services (GFCS), established by the World Meteorological Organization in 2009, aims to enhance and streamline the provision of climate services to support decision-making on climate change. Following the release of the US Federal Framework and Action Plan for Climate Services in 2023, which aspires to provide all Americans, communities, and businesses with access to valuable and practical climate services, GCOOS is actively pursuing the development of a Framework for Coastal Climate Services (FCCS). This framework is instrumental in facilitating the development of CCS (Coastal Climate Services) and establishing integration mechanisms to operationalize CCS for the benefit of the Gulf of Mexico U.S. States.

References

- World Meteorological Organization in 2009, GFCS <https://gfcs.wmo.int/national-frameworks-for-climate-services>
- A Federal Framework and Action Plan for Climate Services PRODUCT OF THE FAST TRACK ACTION COMMITTEE ON CLIMATE SERVICES OF THE NATIONAL SCIENCE AND TECHNOLOGY COUNCIL. (2023). www.whitehouse.gov/ostp
- NCEI , Regional Climate Center (RCC), <https://www.ncei.noaa.gov/regional/regional-climate-centers>

Acknowledgment

- Sharon Mesick -Director, Southern Regional Climate Service
 Professor John Nielsen -Gammon, State Climatologist, Texas
 Debalina Sengupta -Program Director, Coastal Resilience, Texas Sea Grant
 Daniel Cohan -Associate Professor, Civil and Environmental Engineering, Rice University
 Jennifer Vreeland-Dawson -Program Coordinator GCOOS