American Society of Adaptation Professionals
2021 Policy Priorities

Introduction

ASAP is the professional home for close to 700 individuals and over 25 organizations from all sectors of society building essential climate resilience for communities, ecosystems, and economies across North America. ASAP members know that climate change is a real and serious danger to all sectors and systems whose root causes must be addressed; that adaptation and resilience are essential to combating the climate crisis; that equity and environmental justice must be central to our work; and that the natural world provides essential services and has intrinsic value. Addressing the climate crisis swiftly, with creativity and transformative thinking, will bring innumerable benefits to society.

ASAP's 2021 Policy Priorities are:

1. Establish standards for climate data and mandate use of future climate projections.
2. Treat climate change as a crisis and prioritize justice and equity in crisis response.
3. Overlay climate resilience needs on all infrastructure decisions.
4. Preserve, restore, and manage natural systems for climate resilience.
5. Define, develop, and train the climate change adaptation and climate resilience workforce.

These priorities articulate ASAP's responsibility to help create the conditions for members to undertake effective and just climate change adaptation and climate resilience work across all sectors and scales of economy and society. They reflect our responsibility to respond to our members' current needs as we implement ongoing response to the COVID-19 disaster and confront systemic racism. They call on policymakers to consider how the imperative to minimize climate risk and increase climate resilience for its communities, ecosystems, and economies intersects with this moment's urgent healthcare and economic needs.

ASAP's work, and this document, centers the needs of people and communities on the frontlines of climate change. People and communities on the frontlines of climate change are those that experience the consequences of climate change first and worst. They include people who are both highly exposed to climate risks because of the places they live and have fewer resources, capacity, safety nets, or political power to respond to those risks because of widespread discrimination, promoted by histories of colonialism, white supremacy, domination of nature, and economic exploitation. They include Black people, Indigeonous Peoples, people of color, people with low incomes and from low income backgrounds as well as other individuals and communities such as immigrants, those at-risk of displacement, old and young people, people experiencing homelessness, outdoor workers, incarcerated people, renters, people with disabilities, and chronically ill or hospitalized people.

Questions or feedback? Contact ASAP Deputy Director, Rachel Jacobson.

1. Establish standards for climate data and mandate use of future climate projections.

Using locally relevant climate data and climate projections and considering the full range of possible climate outcomes is foundational to effective adaptation. It is critical to establish mandates requiring that future climate conditions be integrated into all decisions including planning, investments, and government program requirements. This requires:

- Allocating adequate resources to existing programs that provide climate data, information, and technical assistance for all sectors and scales to support decision makers with locally relevant data, guidance on the integration of climate projections into decision making processes, and setting standards and codes.
- Taking legal and policy action to establish standards for disseminating and using climate data and information, requiring the use of forward looking climate information in government programs and investments, and requiring climate risk and vulnerability assessments.

2. Treat climate change as a crisis and prioritize justice and equity in crisis response.

It is imperative to act with urgency and resolve to stop the root causes of climate change and to get money and resources in the hands of the people who are on the frontlines of climate change so they can adapt to irreversible impacts. To do this well, governments must:

- Acknowledge the root causes of unequally distributed climate impacts, namely systemic oppression and centuries of unequal investment. Address injustices, especially racial and economic injustices, at their core whenever possible to remove these barriers and create the conditions needed for individuals, communities, and systems to be able to adapt.
- Create dedicated funding streams for the people and communities on the frontlines of climate change and evaluate and eliminate challenges faced by frontline communities in accessing existing resources and services.
- Commit to fair decision-making processes by centering the needs and experiences of those on the frontlines of climate change in policies and programs. Ensure that all individuals and communities have power in the processes and decisions that may affect them.

3.Overlay climate resilience needs on all infrastructure decisions.

Crumbling infrastructure inhibits the well-being of people, threatens our economy, and damages the health of our natural environment. To address this, governments should:

- Direct more government investment to infrastructure projects using existing and new finance mechanisms.
- Create incentives to ensure infrastructure investments align with global best practices in climate resilient design, integrate nature-based solutions, and support climate change mitigation goals.
- Update codes and standards to integrate current and future climate information to allow for infrastructure to accommodate accelerating changing climate conditions.
- Create standards that force property developers to invest in climate adaptive measures and to ensure companies and service providers have a level playing field when they respond to RFPs for infrastructure projects.

4. Preserve, restore, and manage natural systems for climate resilience.

Natural systems have intrinsic value for millions of species, and provide services and functions that support them, including human life, economies, health and wellbeing. They provide irreplaceable regulating services that protect against climate impacts, and they provide the food, water, and materials necessary to sustain life, economies, and society. Continuing to benefit from these services as the climate changes requires:

- Increased uptake of ecosystem best management practices to retain ecological integrity and intactness of existing wildlands, halt land transformation in and around these lands, and introduce measures to halt carbon loss in land transformation. This includes standards for their implementation on government-owned lands and increased incentives -- including access to capital, information and education -- to promote implementation on private lands.
- Strengthening policies and laws that preserve and restore landscapes and ecosystems. Preservation and restoration are both necessary, with preservation being the most effective way to glean climate resilience benefits from mature, functioning landscapes and ecosystems. Therefore, stronger incentives and protections are needed to ensure preservation and to promote restoration where habitat has already been lost.

5. Define, develop, and train the climate change adaptation and climate resilience workforce.

Climate change adaptation and climate resilience is a rapidly growing area of employment. Jobs span a large number of industries in every sector. In order to ensure equitable access to adaptation and resilience jobs, quality job performance, and consistent adaptation and resilience outcomes from work performed, governments need to collaborate with industry, labor, and education stakeholders to:

- Define the climate change adaptation and climate resilience workforce. This requires modifying or adding to occupation codes and classifications to integrate climate change adaptation and climate resilience workers, studying workforce needs and shortages, articulating adaptation and resilience career pathways, cultivating a shared identity for workers, and setting standards to ensure equitable access to entry level and career-building opportunities.
- Invest in -- and increase consistency of -- education and training for climate change adaptation and climate resilience workers. This includes identifying skills and competencies, developing targeted training and apprenticeship programs, increasing incentives for uptake of existing education products, and developing consistent evaluation standards for all education products. Investments in worker education, training, and solutions must be accessible to those on the frontlines of climate change.

House Select Committee on the Climate Crisis
H2-359 Ford Building
Washington, DC 20515

We are pleased to share with the House Select Committee on the Climate Crisis policy recommendations compiled and refined by the members of the American Society of Adaptation Professionals (ASAP). The following document represents both specific policy recommendations and the aspirational ideas that will be necessary to prepare our economies, communities, and environment for a changing climate.

ASAP members contribute leadership and expertise to the resilience and preparedness fields. Accordingly, we would be delighted to provide additional input regarding the urgent need to direct budget and leadership to critical resilient infrastructure policies and programs across our country. In addition to encouraging strong federal leadership, we offer our expertise on the implementation of programs that can enhance the security of infrastructure, improve public health, bolster local, regional and national economies, and lead to sweeping approval and bi-partisan support.

ASAP members bring to their work the highest professional and ethical standards. The considerable years of practical experience represented by our membership has taught us the need for inclusive, authentic stakeholder engagement in concert with the best science and technical expertise. We look forward to working with the House Select Committee staff and members to implement these policy recommendations. Please don't hesitate to let us know how we can be of service to the Committee.

Sincerely,

Beth Gibbons
American Society of Adaptation Professionals Executive Director

2019 House Select Committee on the Climate Crisis RFI Response Working Group Members

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The current and escalating impacts from climate change threaten the health and well-being of all Americans. As a new field of practice, climate change adaptation requires new resources and approaches for assessing and reducing vulnerabilities, sharing information, and overcoming jurisdictional and sectoral barriers to achieve collective resilience. With over 1400 members representing 598 organizations, the American Society of Adaptation Professionals (ASAP) offers collective expertise covering all facets of this rapidly evolving field including risk management, community-based resilience planning and implementation, economic revitalization, and disaster preparedness.

Given our expertise, we are responding to the questions in the Committee's RFI that most directly target adaptation. We begin by highlighting several critical cross-cutting themes, with more detailed policy recommendations in response to the committee's specific questions below. We would be happy to meet with the committee to provide additional input.

- **Mainstream climate.** Evaluate all federal projects and policies through a climate lens that includes social equity and ecological integrity.
    - Integrate climate considerations into existing agencies and policies to the greatest extent possible. Reform and fill gaps where necessary.
    - Prioritize accessible tools for users on the ground within existing programs.
    - Coordinate adaptation, mitigation, and multi-hazard interactions to maximize the co-benefits of climate planning.
- **Be proactive.** Incentivize proactive planning for communities and encourage preparedness for rebuilding more resilient communities if disasters occur.
- **Develop lasting authority.** Create statutory authority for guidelines, approvals, and funding in place of executive action.
    - Emphasize resources for planning and implementation over research; for research, prioritize making downscaled projections nationally available and solutions-focused research.
    - Borrow from Obama-era executive orders, task forces, and councils to avoid re-inventing federal processes and include enforcement capacity.
- **Elevate social equity.** Avoid maladaptive planning that simply shifts existing vulnerabilities in time or place.
    - Engage front-line communities as partners.
- **Support nature-based solutions.** Redesign evaluation processes to fully consider blue/green infrastructure as an alternative to conventional infrastructure.
- **Facilitate local and regional action.** Use the federal government's coordinating and convening capacity to support collaboration across sectors and levels of government.
    - Prioritize frameworks for federal guidance and community-based solutions.
    - Borrow from existing successful models of regional collaboration.

Question 1. What policies or programs should Congress strengthen or create to help communities adapt to changing climate conditions?

The information, data, tools, and expertise to support effective climate adaptation and build resilience remain challenging to access and utilize. While the federal government has played an important role in creating and making climate services available, they still fall short of the needs of local and regional decision-makers. To help communities understand and address climate change impacts at the local level, congressional action and the mobilization of federal technical support and funding is necessary. We recommend these resources focus on the following:

- **Prioritize access to information and technical expertise by providing:**
  - Locally relevant climate information, including down-scaled models, accessible to non-technical staff and guidance regarding best practices for adaptation.
  - Information on financing various adaptation actions.
  - Model policies and ordinances tailored to specific states.
  - Connections to adaptation practitioners who can provide much needed expertise.
  - Direct funding support for adaptation planning and implementation, potentially through a mechanism like the Federal Highway Trust Fund.
- **Support local and regional climate resilience activities**:
  - Strengthen and streamline federal agency capacity.
  - Mainstream climate risk assessment through a National Climate Adaptation and Resilience Policy Act modeled on or added to the existing NEPA framework to ensure that all federal programs account for climate change.
  - Organize existing federal programs under a shared federal authority to improve efficiency and consistency across agencies and to reduce cost.
- **Expand existing federal programs such as:**
  - NOAA Climate Program Office programs, including the Regional Integrated Sciences and Assessments (RISA) program and the Climate Resilience Toolkit.
  - USGS Climate Adaptation Science Centers.
  - US Department of Agriculture Climate Hubs, Regional Climate Centers, and the National Drought Information System.
  - Department of Defense Readiness and Environmental Protection Integration program.
  - Center for Disease Control and Prevention Building Resilience Against Climate Effects (BRACE) Program.
  - Bureau of Indian Affairs Tribal Resilience Program.
- **Revisit recent policy initiatives with potential to help communities adapt if better-funded and implemented, such as the:**
  - Defense Access Roads program for flooding and the Defense Community Infrastructure Pilot Program.
  - FEMA's National Mitigation Investment Strategy and research into the effects of climate migration from locations experiencing the greatest climate change impacts.
  - A Green New Deal should include efforts to adapt to climate change and incorporate local climate services to form part of a green jobs strategy

Question 2. What adjustments to federal disaster policies should Congress consider to reduce the risks and costs of the extreme weather and other effects of climate change that can no longer be avoided?

The federal government has made some progress toward shifting away from reactive post-disaster recovery to a more proactive approach, for example, by assessing vulnerabilities at priority DOD installations. However, more aggressive and comprehensive progress is needed to successfully reduce the risks and costs of extreme weather and other climate impacts. This may be achieved with the following strategies:

- **Be proactive rather than reactive.** Refocus federal pre-disaster funding toward updating new and existing developments to higher standards and away from the renovation or replacement of repetitive loss properties. New standards should consider:
    - Current climate forecasting with broad scientific consensus.
    - Evidence-based future projections, downscaled to specific locations.
    - Multiple hazards modeled concurrently, including rapid-onset, slow-onset, and interactions between hazards (including potential for cascading system failures).
    - Mental and physical human health impacts.
    - Risk of the area, with low-risk areas having higher priority for rebuilding than high-risk ones. Avoid rebuilding critical public infrastructure, such as roads and bridges, in high risk areas.
    - Revised and improved buyout and acquisition programs for at-risk and repetitive loss residential properties by ensuring transparency to increase public acceptance, fairly compensating property owners, aggregating properties to create cohesive ecological conservation districts or publicly-accessible open spaces.
- **Work with, within and across existing agencies.** For example, FEMA and HUD are strategically positioned with existing statutory authority, regular funding, and the appropriate technical and staffing capacity to:
    - Manage complex programs and broaden mandates to prioritize adaptation
    - Refine existing programs (e.g. National Flood Insurance Program (NFIP))
    - Apply lessons from case studies and pilot programs to revise best practices towards proactive climate adaptation
    - Ensure that the most current climate change projections inform existing federally-funded plans such as Community Hazard Mitigation Plans, FEMA's Hazard Mitigation Grant Program, and National Flood Insurance Rate maps (FIRM).
- **Leverage federal capacity for oversight, coordination, and robust funding across disciplines and platforms.**
    - Link key international and domestic partners in the commercial, nonprofit, institutional, and INGO sectors.
    - Catalyze existing progress already made at multiple levels of government to facilitate regional collaboration, coordination, and action.
    - Identify existing funding, partnership, and research models applicable to the U.S. domestic context.

Question 3. How should Congress update the laws governing management of federal lands, forests, and oceans to accelerate climate adaptation, reduce greenhouse gas emissions, and maximize carbon storage?

For lands, forests, and oceans to maintain critical ecological services, maximize carbon storage on a system-wide scale, and support adaptation, they must be fully cared for and managed. Congress should refer to scientific, system-based ecosystem service management that focuses on preservation, understanding the interactions of people and federal lands, and recognizing the contributions of, and risks to, indigenous communities. Stakeholders should be engaged as partners, as active collaboration among federal, tribal, state, regional, private, and non-profit organizations will contribute to long-term adaptive and integrated climate systems solutions.

Reforming the Robert T. Stafford Disaster Relief and Emergency Assistance Act

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) mandates "replacement-in-kind" which keeps communities from rebuilding after disaster to be more resilient and prepared for the disaster. In 2012, the Federal Emergency Management Association (FEMA) announced a policy that allows communities to consider sea level rise when rebuilding, but the **Stafford Act must be changed to allow FEMA to upgrade infrastructure and housing to climate-adapted standards after a disaster.** Rather than *allowing* communities to consider sea level rise, Congress should mandate adaptation planning as part of Stafford-allocated funds, including securing additional funding specifically for infrastructure and structural relocation out of flood zones. Congress should thus implement recommendations following the National Resource Defense Council's report "Going Under: Long Wait Times for Post-Flood Buyouts Leave Homeowners Underwater" which was requested by H.R.5846 - Promoting Flood Risk Mitigation Act

- **Climate change is the lens.** View all laws that support federal land, forest, and ocean management from this perspective, and include both adaptation and mitigation needs.
    - Shift from a paradigm prioritizing resource use to management practices that focus on ecological health, adaptive capacity, and a healthy climate.
- **Prioritize preservation over restoration** while working to reduce and minimize extraction on federal lands.
    - Untouched wilderness provides far greater climate benefits than restoring degraded forests or healing damaged lands and oceans. Restoration can take decades to sequester the carbon lost through rapid deforestation.
    - Smart management and use of federal lands must emphasize and provide for the restoration and regeneration of natural systems that have been negatively impacted by past management and resource extraction practices.
- **Understand socio-ecological interactions better.**
    - Enhance and/or enact laws that have much stricter and broader enforcement of protections where federally managed lands, forests, and oceans interface with human development (i.e. wildland-urban interface).
    - Consider interactions between potential hazards, including impacts from outdated infrastructure design, planning, and management (i.e. impacts from electric utilities responding to wildfire conditions).
- **Recognize the contributions of – and threats to – indigenous and native peoples who:**
    - Are often at the frontlines of a changing climate, yet contribute the least to greenhouse gas emissions

- Already face economic and political marginalization, human rights violations, loss of land and resources, etc.
- Have critical knowledge and agency to help enhance the resilience and management of the many ecosystems within their lands and territories and beyond.

Question 4. How can Congress better identify and reduce climate risks for front-line communities, including ensuring that low and moderate-income populations and communities that suffer from racial discrimination can effectively grapple with climate change?

Front-line communities have historically faced disproportionate hazards and risks, with federal programs often directly contributing to these conditions. Adaptation policy should address both the larger structural dynamics of inequity and marginalization as well as the gaps in financial well-being and success at the individual level. Legislation tailored to front-line and marginalized communities should strategically leverage federal resources to enhance existing funding, identify new funding streams, reform policies, and prioritize direct engagement.

- **Work with existing agencies and programs through an environmental justice lens**
  - Leverage agencies with the existing statutory authority, skill, and staff capacity to meet the needs of front-line and marginalized communities (i.e. FEMA, HUD, USDA, BIA).
  - Incorporate environmental justice considerations and equity filters into all climate programs, assessments, and procurements.
  - Mitigate risk transfers to frontline and marginalized communities in federal programs and through regulating financial and insurance industries.
  - Fund support for climate refugees, including renters, to find new jobs and housing and settle in their new locations; track and reduce exposure and social vulnerability for relocated people.
  - Enable development of national strategies and programs to manage extreme heat risks at the local level, especially in urban areas.

Opportunities for Agency Action
Specific agencies involved with frontline communities could offer the following support:

- Department of Labor for jobs and human capital investment;
- EPA for technical assistance, e.g. inventorying and guiding green infrastructure establishment;
- FEMA for risk identification, mitigation, and reduction;
- HUD for affordable resilient housing that avoids locations exposed to climate change;
- NOAA, NIST, and USGS for data, forecasts, and capacity building (e.g. NIST Community Resilience Planning Guide);
- USDA shaping how aid in the Farm Bill is allocated.

- **Actively engage frontline and marginalized communities in planning and implementation**:
  - Require federal RFPs to actively engage communities in research, planning, decision-making, and implementation to co-produce adaptation solutions.
  - Ensure federal hiring practices build local capacity and leadership opportunities for climate adaptation in front-line and marginalized communities.
  - Streamline paperwork and reporting demands in federal grant programs and proposals burdening front-line and marginal communities.

  - Work directly with states, state agencies, and local governments to identify and directly support front-line and marginalized communities.
  - Incorporate climate adaptation and resilience into Green New Deal policies, including job creation, retention, and transition to a green economy.
- **Prioritize and innovate public and private funding for the most vulnerable.**
  - Direct allocations to the highest-risk communities unable to adapt without government support.
  - Use existing vehicles such as federal loans and grants, state and local taxes and fees, private sector investments, and philanthropic grants.
  - Pioneer innovative funding mechanisms such as resilient low-income affordable housing, rapid post disaster emergency financial restructuring, real estate contracts, and tax laws that capture the value of adaptive interventions including nature-based solutions.

Reforming the National Flood Insurance Program

The National Flood Insurance Program (NFIP), created in 1968, funded by the Stafford Act and reauthorized by Congress every 5 years, provides insurance at rates otherwise unavailable to owners of at-risk properties. It is well positioned to have broad impacts on climate resilience. However, it also incentivizes replacement and rebuilding in flood-prone areas and insufficiently accounts for future climate conditions, creating a moral hazard. The NFIP could be reformed to proactively incorporate climate adaptation:

- Reflect climate projections in Flood Insurance Rate Maps (FIRMs). Support Risk Rating 2.0 reforms.
- Avoid construction in high-risk areas altogether.
- Build on the Community Rating System's (CRS) potential for pre-disaster focus and fostering the adaptive capacity of neighborhoods.
- Pair with property acquisition programs (i.e. FEMA) to aggregate properties for transition into cohesive ecological conservation districts or publicly accessible open spaces.
- Explore incentives for other climate adaptation techniques such as managed relocation, transfer of development rights, and nature-based solutions / blue-green infrastructure.

Question 5. What policies should Congress adopt to help farmers, ranchers, and natural resource managers adapt to the impacts of climate change?

Farmers, ranchers, and natural resource managers are already feeling the direct and indirect impacts of climate change. Congressional action should support these stakeholders by providing better access to information and tools, helping to close information gaps, and by providing education and technical assistance and additional funding. Specifically:

- **Provide information and tools.** Focus applied research to expand the base of actionable, science-based information on climate change adaptation. Programs should identify and target key knowledge gaps through collaborative research approaches that engage stakeholders and practitioners in the co-production and dissemination of knowledge. Increase funding for existing programs such as:

  - NOAA's Regional Integrated Sciences and Assessments (RISA) program, Regional Climate Centers (RCCs) and National Estuarine Research Reserves (NERRS) program
  - USGS Climate Adaptation Science Centers (CASC)
  - USDA Climate Hubs
  - FWS's Landscape Conservation Cooperatives Network (LCC)
- **Make tools accessible, easier to find, understand, and use.**
  - Prioritize development and deployment of locally relevant climate information including historic information and downscaled climate information.
  - Support the development of open data tools or technologies to improve access to real-time climate forecasting including existing knowledge dissemination tools such as the U.S. Climate Resilience Toolkit, National Integrated Drought Information System (NIDIS), and Climate.gov.
- **Enhance educational and technical assistance programs to help stakeholders apply existing knowledge.**
  - Increase support for existing institutions such as land grant colleges and agricultural extension services to deliver climate adaptation programs.
  - Target capacity gaps in adaptive strategies such as crop diversification, no-till agriculture, soil conservation, energy-efficient irrigation, multistrata agroforestry, tree intercropping, regenerative agriculture, closed loop agriculture, natural fire risk reduction techniques, economic diversification, accessing local markets, and emission reduction techniques.
  - Adopt policies that facilitate cooperation across political boundaries to effectively manage natural resources.
  - Prioritize long-term interventions such as farmland restoration that support the transition to low-emission and resilient practices.
- **Integrate climate science into federal policies and budget planning**
  - Leverage federal investments, guide decision-making, discourage maladaptation, and incentivize climate action and environmental stewardship.
  - Maintain existing protections for natural resources.
  - Integrate climate impact assessments and cost-benefit analyses into agricultural subsidies and federal budget directives.
  - Consider climate projections and risks when reviewing current and future programs and grants.

Question 6. What policies should Congress adopt to maintain and expand monitoring, research, and assessment efforts in order to support solutions to the climate crisis and provide decision-makers – and the American people – with the information they need? Please speak to the scale of investment needed to achieve results.

Increasing support for climate monitoring, research, and assessment is critical for informed decision-making. Federal programs are crucial for providing fundamental science and data which in turn supports private sector and university-based climate services for communities, organizations, and individuals. The current climate services economy is limited by confusion over appropriate methods and inequitable access, especially for front-line communities and Tribes (Question 4 for more discussion of front-line communities).

- **Monitoring and reporting** provide a critical feedback loop for researchers and practitioners on the effectiveness and progress of various interventions.
    - Implement standardized reporting on greenhouse gas emissions, climate risk, and mitigation and adaptation actions by state and local governments, federal agencies, and non-governmental actors.
    - Support the creation of an integrated reporting system that will advance efforts to track progress toward climate goals and identify best practices.
    - Build on existing tools and standards such as those used by the FEMA Community Rating System, the Global Covenant of Mayors for Climate and Energy, and CDP.
    - Develop national-level indicators for adaptation, building on research and indicator development efforts emerging from the bottom-up
- **Research:**
    - Increase funding and support for current federal research programs, related institutes, and university-based research such as:
        - NOAA program including Regional Integrated Sciences and Assessments (RISA) program, the Climate Resilience Toolkit, Regional Climate Centers, National Drought Information System, and National Estuarine Research Reserves (NERRS) program
        - USGS Climate Adaptation Science Centers
        - U.S. Department of Agriculture Climate Hubs
    - Include regional and thematic specialists on staff to achieve results.
    - Emphasize interagency coordination to help improve efficiency and reduce the burden on local actors working with multiple agencies.

Moving from Assessment to Practice

Monitoring, research, and assessment programs can leverage public involvement and "citizen science" to advance and apply the work done through federal agencies such as the National Climate Assessment.

A civil-society-based Science for Climate Action Network (SCAN) has been established to develop and implement this new approach, as described in several reports published here and here. Initial annual appropriations of $2 Million per year will be used to establish the network and will need to grow to $10 Million per year once network nodes are established in universities and other organizations.

- **Assessment:**
    - Expand the US National Climate Assessment (NCA) beyond a focus on assessing vulnerability to establish best practices for evidence-based adaptation and mitigation.
    - Make NCA information more widely available in easy to use formats to help consumers of climate services make informed choices.
    - Ensure that NCA information is accountable and accessible to front-line communities.

ASAP Living Guide to the Principles of Climate Change Adaptation

American Society of Adaptation Professionals

www.adaptationprofessionals.org

Contents

Send feedback on this document to rjacobson@adaptpros.org
Illuminate this document with existing case studies: https://goo.gl/forms/5imfd71giwObB3Xl1

1. Introduction

This document is designed to articulate the values, norms, goals, and practices that have emerged through over a decade of experimentation, research, and on-the-ground work in the climate change adaptation field. It is meant to be accessible by both experienced and new members of the field. This is not a how-to guide for undertaking an adaptation process. Rather, it is a collection of fundamental principles for engaging in professional activities in the field of climate adaptation. These principles also underpin all of ASAP's education and training activities for adaptation professionals and climate-affected professionals. This is an iterative effort: practitioners, workers, and applied researchers in the climate change adaptation field have ongoing opportunities to improve this document.

2. Value & Beliefs

Adaptation professionals are responsible to act on the basis of values in addition to knowledge. ASAP's Code of Conduct & Professional Ethics articulates the values and beliefs that the American Society of Adaptation Professionals, and its members, hold. These values and beliefs form the foundation for equitable, ethical, and effective climate change adaptation and climate resilience practice.

- Climate change is a real and serious danger to all sectors and systems. Its root causes must be addressed.
- Adaptation and resilience build stronger, more prepared regions, ecosystems, communities, economies, neighborhoods, and households.
- The natural world has intrinsic value and provides countless essential services.
- Adaptive decision making, creativity, innovation and transformative problem solving are essential tenets of work that addresses new and changing climate conditions.
- Individuals and communities on the frontlines of climate change hold expertise and resilience that should be centered in adaptation processes and decisions.
- Science and Traditional Ecological Knowledge are critical foundations for our climate adaptation knowledge.
- Grave injustices of the past, which have been allowed to perpetuate today, have created an unjust and inequitable society. Climate change exacerbates these inequities.

These values are consistent with the ASAP's Justice, Inclusion, Equity, and Diversity Statement which articulates ASAP's commitment to advancing racial justice in its organization, among its members, and in the field of climate change adaptation and climate resilience.

3. Desired Outcomes

This section articulates the core outcomes that adaptation professionals should seek to achieve through your work: enhance adaptive capacity and reduce exposure and sensitivity. You should work to enhance adaptive capacity and reduce exposure and sensitivity for all individuals, communities, and systems. They should seek to first and foremost do so for those on the frontlines of climate change. People and communities on the frontlines of climate change are those that experience the consequences of climate change first and worst. They include people who are both highly exposed to climate risks because of the places they live and have fewer resources, capacity, safety nets, or political power to respond to those risks because of widespread discrimination, promoted by histories of colonialism, white supremacy, domination of nature, and economic exploitation. They include Black people, Indigeonous Peoples, people of color, people with low incomes and from low income backgrounds as well as other individuals and communities such as immigrants, those at-risk of displacement, old and young people, people experiencing homelessness, outdoor workers, incarcerated people, renters, people with disabilities, and chronically ill or hospitalized people.

Enhance adaptive capacity

Adaptation action seeks to enhance a system's ability to prepare for and adjust to climate change -- including climate variability and climate extremes. When taking action to enhance adaptive capacity, it is valuable to acknowledge that poor individuals and communities may have less capacity to adapt because of widespread discrimination, promoted by histories of colonialism, white supremacy, domination of nature, and economic exploitation. It is also helpful to acknowledge that rich individuals and communities may experience greater amounts of financial loss during extreme events.

Reduce exposure and sensitivity

The consequences of climate change can be reduced in magnitude by decreasing exposure and sensitivity, thus decreasing vulnerability. Reduce exposure by creating conditions for people to stay out of harm's way, for example: disincentivizing building in the floodplain. Reduce system sensitivity by protecting the things that regulate that system, for example: protecting the tree canopy that mitigates extreme urban heat. Further reduce overall vulnerability by improving the underlying conditions that make one susceptible to harm, such as health, economic status, and access to resources. Acknowledge that reducing exposure and sensitivity, such as by retreating from a coastal settlement, can result in the diversion or loss of social, economic, or environmental resources. You should understand and plan for these potential losses.

3. Principles

This section articulates the principles for doing quality climate change adaptation work. Due to the expansive nature of the adaptation field, some principles will apply more strongly in certain areas of work. You should expect to experience tension between principles and seek to cultivate relationships and identify tools to remain aware of how they are prioritizing application of some principles over others and seek to find balance that best contributes to desired outcomes.

Think in systems

Acknowledge that we live in an interconnected world, and consider how problems, actions, and solutions relevant to one component in a system can trigger changes in the other components. Holistically consider the multitude of intersecting risks that social and ecological systems face. This includes risks derived from both climate and non-climate hazards. Look holistically at the benefits of solutions and actions. Articulate and maximize co-benefits to increase the inherent value of projects, and increase partnerships, support, and collaboration.

Address the root causes of climate change

Acknowledge that adaptation will only be successful in the long-term if concurrent mitigation efforts are successful at maintaining safe levels of carbon dioxide in the atmosphere. Ensure that climate change adaptation actions are consistent with and supportive of mitigation actions. Certify that adaptation actions are low-emissions. Work in synergy with climate change mitigation whenever possible. Appreciate limits to adaptation and push mitigation.

Recognize content

Contextualize adaptation research, policies, practices, communication, and actions to the appropriate issues, location, and scale. Understand existing, underlying conditions and vulnerabilities that climate change may exacerbate before deciding what adaptation action to take. Design strategies to adjust over spatial and temporal scales, and account for variability and extremes. Assess localized outcomes of adaptation actions.

Safeguard people

Safeguard the health, well-being, safety and existence of all people affected by an adaptation action. Focus on more vulnerable populations, engage those who have traditionally been disenfranchised, and consider multiple, intersecting vulnerabilities, systemic injustice, and oppression when identifying problems and solutions. Assess all strategies to ensure that they do not have disproportionate negative impacts on these populations. If possible, adaptation strategies should actively strengthen these populations.

Safeguard nature

Explicitly address the needs of ecological systems, including fish, wildlife, and plants, in adaptation strategies. Assess all actions to ensure that they protect or enhance the capacity of ecosystems to sustain function over time, and that human communities can continue to sustainably derive benefits from them in the long-term.

Use best available science and knowledge

Ensure adaptation-related decisions are consistent with and responsive to the best-available science about climate change and current knowledge of how it will affect human and natural systems. Use the full range of scientific tools, including both quantitative and qualitative methods, community knowledge, Traditional Ecological Knowledge, collaboration among the sciences, and the informed co-production of knowledge. When given the opportunity to design or implement an adaptation process, follow a vetted adaptive management process. Update policies and shift priorities as new information becomes available.

Use projections about future conditions

Whenever possible, use projected future conditions, rather than averages over time, when planning for social, economic, ecological and other impacts, and in assessing prospective risk and vulnerability. Incorporate the full range of possible climate outcomes in assessments and plans, including highly uncertain events, acknowledging that conditions are becoming increasingly dynamic. Consider projected future conditions across all variables that may influence the outcome of adaptation actions, such as demographic and economic conditions. Continually re-evaluate underlying goals in light of new knowledge about projected changes.

Avoid harm

Evaluate the impacts of adaptation actions on potentially affected systems, scales, and sectors for both short- and long-term time horizons. Guard against maladaptation by assessing potential impact across sectors, scales, and systems and by engaging multiple, diverse stakeholders in the process. Consider externalities, minimizing disproportionate impacts to some at the benefit of other regions, generations, social groups, or systems. Recognize that sometimes the optimal solution requires some level of harm to a sector, system, or population. In those instances, seek to minimize harm and maximize options of people with less political and social power.

Understand injustice and work towards justice

Grave injustices of the past, which have been allowed to perpetuate today, have created an unjust and inequitable society. Climate change exacerbates these inequities, as those who are the least responsible for climate change are often the most impacted. Widespread discrimination, promoted by histories of colonialism, white supremacy, domination of nature, and economic exploitation have created systems that inhibit otherwise capable communities and ecosystems from thriving. Understand systemic injustice and oppression and the resulting barriers to adaptation. Address injustices at their core whenever possible to remove these barriers and create the conditions needed for individuals, communities, and systems to be able to adapt.

Ensure fairness in decision making

Adaptation professionals inform and influence decisions, design decision making processes, and make decisions that affect people, nature, and the systems on which they depend. Decision makers hold power. That power is sometimes used to limit people's access to decision-making structures, particularly people and communities on the frontlines of climate change. It is critical that climate change adaptation creates opportunity for the people on the frontlines of climate change to build power through decision making. Use what power you hold to help ensure that all decisions and the processes by which they are made include representatives from all affected groups. Whenever possible, those in power should use the principle of "decide with, not for." In situations where one must decide "for," they should seek to maximize transparency, accountability, and follow-through and minimize harm and maximize options. Seek to especially minimize harm and maximize options for people who have little political power due to historical injustices.

Ensure equitable distribution of costs and benefits

Ensure that the costs of adapting to climate change and the benefits of adaptation actions are equitably distributed. This means paying particular attention to individuals and groups on the frontlines of climate change, those disproportionately affected by climate impacts, and historic inequities in the distribution of benefits.

Network and learn together

We are all in this together, and our successes amplify and build on each other. Adaptation is contextual, but there are similarities in approaches across regions and sectors. Create templates and models that can be modified, tailored, or adapted to a particular context. Create the conditions for transferring and scaling solutions. Acknowledge that sharing best practices, learning by doing, and iterative and collaborative processes can help support local and overall progress. Use case studies, organizations spanning sectoral boundaries, and networks to connect and learn. Avoid reinventing the wheel by continuously communicating successes and challenges with peers and colleagues. Develop new, innovative ideas through dialogue and collaboration.

Collaborate

Integrate a diverse set of individuals and types of organizations into adaptation work, including representatives from government entities at all scales, non-governmental organizations, corporations and businesses, community groups, and philanthropy. Create opportunities to include people at multiple levels of organizations, and unaffiliated individuals. Create a common agenda that is beneficial to all parties. Develop shared processes and align effort to maximize connection and efficiency. Involve all partners in all actions, from problem identification through evaluation. When feasible, create infrastructure and dedicated staff that cuts across sectors and organizations.

Use existing best practices

Many of the promising practices for adaptation work are general best practices that apply outside of the adaptation field as well. Two prominent categories are program design and management, and communications and engagement. The sections below describe best practices for each that should be applied in adaptation work.

Program design and management

As with other changes to the status quo, adaptation happens through programs, initiatives, projects, and plans. You should apply best practices for designing and managing them, including:

- Establish needed financial and human capacity.
- Consider project longevity and continuity, especially with respect to political changes and funding changes.
- Design for and incentivize implementation.
- Maintain contact with stakeholders throughout the program's life.
- Establish shared goals and expectations with stakeholders.
- Maximize effectiveness and efficiency by modeling work on pre-existing models or templates modified for your context.
- Monitor and evaluate your work to inform improvements in future projects.

Communication and engagement

Effectively communicate and engage with all those impacted by your work, particularly residents affected by climate impacts or adaptation actions. Best practices for effective communication and engagement include:

- Articulate co-benefits to encourage stakeholder support.
- Use language and concepts that resonate with your audience.
- Respect and consider people's point of view, especially people who have experienced oppression or trauma
- Work with organizations spanning sectoral boundaries, community organizations, and other trusted messengers to communicate and engage.
- Establish shared goals and objectives with stakeholders.
- Use transparent and iterative processes.
- Be respectful of people's time and wary of stakeholder burnout. Lower barriers to engagement by paying people for their time, communicating with them in their language of choice, and offering food and childcare.

Take care

Many of us are in the climate adaptation field because of our love of nature, people, and places. We work tirelessly to address climate change everywhere – prioritizing communities on the front lines. Through this work, we often understand and feel the loss of nature and the impacts on people and communities that will continue to worsen under business as usual. We cannot unknow what we know and oftentimes, that can cause anxiety, grief, and trauma for professionals working in this field. In order to continue being of service to our planet, communities, colleagues, and families for the long-term, we need to take good care of ourselves. This includes regularly checking in with ourselves and each other on our emotional and physical well-being. Several useful methods of taking care of ourselves include, but are not limited to:

- Get outside and reconnect with nature!
- Set healthy boundaries that include taking breaks from work.
- Practice active hope and gratitude.
- Lean into uncertainty and practice flexibility.
- Remain open-minded.
- Practice asking for help before, during, and after a crisis occurs.
- Practice empathy, compassion, and gratitude toward yourself and others.
- Develop and maintain healthy routines and outlets for stress.
- Connect with your neighbors and community.

ASAP provides resources and group sharing experiences (i.e., member-led support groups) to help its members actively foster nourishing ways to sustain themselves through the difficult, long work of adaptation and building just and safe climate futures.

4. Strategies & Approaches

This section articulates tried and true strategies and approaches for gaining traction for adaptation action and maximizing its effectiveness. Context will dictate which approaches are most applicable and how they should be used.

Recognize and Activate Leadership

Understand that leaders with the ability to spur adaptation action come from all places in society. Seek out and recognize leaders and create platforms for their voices and ideas. Activate leadership where it is latent to spur greater adaptation action and increase the reach of adaptation benefits.

Mainstream climate change information & adaptation action

Seek out opportunities for integrating climate change information and adaptation actions into systems, budgets, plans, policies, projects, and practices of all kinds. Consider adaptation at the inception of an action, rather than added in the middle or as an afterthought. Use mainstreaming opportunities to increase project co-benefits.

Improve connection to improve resilience

Recognize that strong social connections make human communities more resilient and that protected and connected natural spaces create more resilient ecosystems. Take actions that increase connections among people, between human communities and natural systems, and between tracts of land suitable for species to thrive.

Ensure flexibility, robustness, and redundancy

Manage uncertainty about the future by implementing actions and processes that can respond to changing circumstances (flexible) and perform well under a variety of conditions (robust). Manage the tradeoffs between flexibility and robustness by creating safeguards in the case of failure (redundancy). Consider near and long-term implications of action. Account for future climate influence on long-term project impacts.

Optimize incentives and penalties to promote ideal outcomes

Optimize social, financial, legal, and regulatory incentives and penalties to achieve preferred adaptation outcomes, avoid maladaptation, and form the foundation for many adaptation actions and successes.

Use windows of opportunity

Use windows of opportunity, such as natural disasters or scheduled updates to plans, to build support for adaptation action. Balance this reactive strategy with use of other, proactive strategies such as mainstreaming.

5. Categories of Action

This section articulates categories of action that encompass most types of adaptation work. Review this section to see examples that illustrate how the principles, strategies, and approaches described above can be put into action.

Measure and Learn

Monitoring changes in the climate system, gathering and analyzing data to build understanding of climate impacts and climate risk, and monitoring and evaluating actions taken to adapt to climate impacts.

Examples:

- Enhance, develop, test, or deploy inventory, monitoring, observation, and information systems at multiple scales to detect and describe climate impacts on people, built environment, fish, wildlife, plants, and ecosystems.
- Assess the vulnerability and risk of communities to climate impacts.
- Monitor and communicate progress towards implementation of climate adaptation projects.
- Evaluate adaptation options, including social, environmental, and economic costs and benefits.
- Monitor and evaluate the outcomes and impacts of adaptation projects and programs
- Process and reflect on the lessons from adaptation projects and programs and integrate them into future projects and programs.

Principles, Strategies, and Approaches in Action

- Think in Systems: Formulate research questions based on a holistic understanding of threats and risk. Evaluate projects based on a holistic understanding of success. Design observation systems and research projects that look at entire systems.
- Collaborate: use partnerships to fund research, put monitoring systems in place, and collect data.
- Network and Learn Together: share data, analysis frameworks, and lessons learned.
- Use projections about future conditions in assessments

Plan

Considering climate science, climate impacts, and climate risk in institutional planning

Examples

- Incorporate adaptation into existing plans, such as state or local hazard mitigation or comprehensive plans; species, habitat, or land management plans; and sector-specific planning such as water resources or coastal plans
- Create new planning processes, following a vetted adaptive management approach.

Principles, Strategies, and Approaches in Action

- Use Best Available Science to inform planning, and follow a vetted adaptive management process when designing your planning activities.
- Use projections about future conditions when determining what you are planning for
- Collaborate: Coordinate climate change planning efforts across jurisdictions, such as at the regional scale. Consider establishing a central coordinating body responsible for addressing climate change and long-term planning.
- Mainstream climate change information & adaptation action: incorporate adaptation into existing plans, capitalizing on co-benefits of integrated planning.
- Address the root causes of climate change by planning to create conditions that will simultaneously increase climate resilience and decrease greenhouse gas emissions.
- Use communication and engagement best practices to integrate diverse individuals into the planning process and ensure plans represent the interests of the full fabric of the community.

Fund & Invest

Repurposing, leveraging, or obtaining public or private funds to finance or invest in adaptation actions

Examples

- Integrate adaptation into capital improvement plans and budgets
- Create a microfinance system to provide capital for small neighborhood projects.
- Establish an infrastructure bank to leverage private finance for climate resilient capital projects.
- Use municipal plastic bag fees to fund stormwater improvements and prepare for severe urban heat.
- Apply for public and private grants.

Principles, Strategies, and Approaches in Action

- Ensure equitable distribution of benefits: prioritize allocating adaptation funding to those who are most vulnerable to climate impacts.
- Mainstream: optimize use of existing funding sources and leverage existing investments.
- Align incentives and penalties to promote ideal outcomes: use financial penalties from maladaptive actions towards adaptation work.
- Use windows of opportunity: Use climate-related extreme events and disasters as an opportunity to open a conversation about the cost of inaction, and inspire allocation of additional funds to climate adaptation work.
- Think in Systems: holistically articulate and exploit co-benefits to create additional value in adaptation work and encourage allocation of additional funds.

Develop & Deploy Technology

Developing and deploying climate-resilient technologies, and technologies that enable climate resilience.

Examples

- Create drought-resistant crop varieties
- Establish advanced early warning systems
- Advance low-carbon energy technology

Principles, Strategies, and Approaches in Action

- Ensure flexibility, robustness, and redundancy of technology so it is resilient in the face of changing future conditions.
- Think in systems: Address problems and solutions holistically by designing technology that addresses complex problems and offers multifaceted solutions.
- Network and learn together: dialogue and iterate with colleagues and users to create truly useful products and services.

Communicate & Engage

Communicating with people and institutions the information they need to prepare for climate impacts, communicating information about adaptation actions being taken on their behalf, and engaging individuals and institutions in iterative processes to increase the effectiveness and equity of climate adaptation action.

Examples

- Disseminate climate information and decision support tools to people and institutions, and hear and integrate their feedback to improve them.
- Develop and deliver trainings and workshops to help practitioners and the public build adaptation-related knowledge and skills, and hear and integrate feedback to improve them.

Principles, Strategies, and Approaches in Action

- Recognize context: tailor information, tools, and education products and processes to local culture, needs, hazards, and assets.
- Use communication and engagement best practices
- Use windows of opportunity: Use climate-related extreme events and disasters as an opportunity to encourage increased participation in education and engagement opportunities and increased use of climate adaptation information and decision support tools.
- Mainstream: communicate and engage on climate adaptation through existing, well-used channels in the community.

Build Physical Infrastructure

Building new or improved physical infrastructure aimed at providing direct or indirect protection from climate hazards.

Examples

- Preserve and restore habitat features to maintain ecosystem function and resilience to climate change.
- Install nature-based infrastructure, such as bioswales and green roofs, to increase urban flood and heat resilience.
- Enhance pumping, piping and storage infrastructure and drainage systems to protect from intense urban flooding.

Principles, Strategies, and Approaches in Action

- Use program design and management best practices: in particular, monitor and evaluate projects to ascertain effectiveness and improve future projects.
- Network and learn together: explore what others have done and learn from their successes and challenges.
- Mainstream: incorporate climate considerations and adaptation principles into existing plans for infrastructure projects.
- Use projections about future conditions to design infrastructure that will function well under future climate conditions.
- Ensure flexibility, robustness, and redundancy in structural design.

Shift Management Practices and Recurring Behavior

Incorporating climate adaptation considerations into land management, and day-to-day practice and behavior of professionals and laypeople.

Examples

- Encourage use of climate-resilient soil, land management, and livestock management techniques.
- Encourage adaptation action on personal property such as rainwater collection and energy efficiency practices.
- Conserve, restore, and establish new ecological connections among conservation areas to facilitate fish, wildlife, and plant migration, range shifts, and other transitions caused by climate change.
- Optimize urban street tree maintenance protocols for new climate conditions.
- Create targeted education and outreach efforts and stewardship opportunities that help institutions, communities, or individuals achieve behavior or management change.
- Develop and bolster human and social capital to increase connectedness of communities.

Principles, Strategies, and Approaches in Action

- Recognize context: promote behavior change and management practices that align with local culture, capacity, and needs
- Network and learn together: explore options and offer ideas based on experiences in other places.
- Align incentives and penalties to promote ideal outcomes
- Think in systems: emphasize co-benefits of behavior changes, such as cost savings from energy efficiency.

Change Policy and Law

Revising, or creating new, law, policy, or regulation that requires or incentivizes adaptation action and penalizes maladaptation.

Examples

- Ensure local policies and regulations reduce exposure to hazards. For example:
- Modify local ordinances to limit development and redevelopment in coastal high hazard areas.
- Implement buy-out and relocation programs.
- Create policies that encourage nature-based infrastructure. For example:
- Eliminate regulatory barriers to installing living shorelines.
- Create financial incentive for incorporating green infrastructure into new commercial/industrial buildings.
- Require cool roofs on new homes.

Principles, Strategies, and Approaches in Action

- Ensure equitable distribution of costs and benefits by assessing how law and policy changes will impact different populations
- Think in systems: ensure changes in policy, law, and regulation do not transfer problems from one place to another.
- Align incentives and penalties: use law and policy changes to encourage adaptation action and discourage maladaptation.
- Ensure flexibility, robustness, and redundancy: create processes for policy and law to continue to change over time.
- Mainstream: change existing laws and policies where feasible, and create new when needed.
- Use windows of opportunity: use increased desire for action, such as following a natural disaster, as a window of opportunity for success in proposed law and policy changes. Design desired law and policy in advance to be ready when an opportunity arises.

Appendix 1: Research Protocol Summary

Research purpose: Advance and bring greater consistency to the work of climate adaptation and community resilience professionals. Inform the work of climate-affected professionals.

Research Scope: Identify generally agreed upon leading adaptation practices.

Methodology: qualitative content analysis with a combined deductive and inductive approach.

Methods

1. Identify unit of analysis: "promising practice" (ie "principle").
2. Conceptualize analysis matrix articulating existing knowledge about "promising practice" categories.
3. Gather data by content. Data sources:
    a. Notes from informal ASAP focus groups on this topic.
    b. Self-identified "promising practices" (ie - practices, themes, approaches, strategies, implementation actions) as they appear in executive summaries, tables of contents, conclusions, or recommendations sections of major climate adaptation synthesis reports.
4. Group: relate pieces of data to analysis matrix, and code: develop new groupings.
5. Categorize: develop and synthesize groupings to create list of promising practices/principles.
6. Write report: contextualize, model, conceptualize, synthesize, and challenge the promising practices.

Assumptions

1. List of major climate adaptation synthesis reports is comprehensive.
2. Synthesis report authors have summarized the most relevant information about promising practices in something identifiable as such (e.g. executive summary, conclusion, list of practices or themes.)

Biases

- Researcher used judgment about what is or is not relevant data for the report (see assumption #2 above)
- ASAP focus group rigor has not been assessed.
- Some synthesis reports capture what is being done on the ground, and some reports analyze what is being done and make recommendations based on effectiveness. Researcher did not identify an objective way to differentiate between the two.

Mechanism for ensuring rigor: Iterating with ASAP members and other individuals from across sectors and scales in the climate change adaptation community.

Appendix 2: 2019 Update Summary

Between Jan-Sep 2019, ASAP updated the Living Guide to incorporate themes from new field-spanning literature published since the first version of the Living Guide was released and thus ensure that the Living Guide remain "living" and serving ASAP members and the adaptation field as best as possible. The aims of the updates were to ensure that the Living Guide is consistent with the current practice of adaptation, broaden the scope of the Guide's principles and actions, create a more robust and inclusive document, and demonstrate the existing principles through case studies.

To begin this work, ASAP collaborated with Masters students in the Spring 2019 Climate Change Adaptation, Mitigation and Resilience course at Antioch University of New England. The students reviewed the original literature from which the Living Guide was derived, as well as additional peer-reviewed sources from the field, to find case studies relevant to the principles and categories of action, as well as identify themes that could be better incorporated into the Living Guide. Students found a variety of practical examples showcasing the Values, Beliefs, Strategies, and Approaches listed in the Living Guide; they found that while the original principles were comprehensive, they were not exhaustive. This fluid, reflexive approach to examining climate adaptation literature allowed for reflection on the soundness of the Living Guide framework as well as opportunities to expand on the founding principles and actions. ASAP acknowledges and thanks those who participated in this project: Adam Galambos, Olivia Jones, Antone Lima, Suzannah Macdonald, Flick Monk, Erik Nielsen, Virginia Patsun, Jessica Poulin, Shaylin Salas, Meagan Sylvia, Raleigh Tacy, Morgan Urquia, Gabriel Vazquez, Dr. Christa Daniels (course instructor).

ASAP staff reviewed the students' final report and materials to compile a list of recommendations for improving the Living Guide. Overall, the student project and subsequent staff analysis revealed that the guide did not require a substantial number of content changes. However, the review identified the following recommendations which informed changes made in this updated version:

- Recognizing limitations and barriers to adaptation, and the conditions that create them, as well as what is necessary to make adaptation and its benefits accessible to all.
- Leadership: while the Living Guide does a good job of describing the importance of being a leader, it could more specifically call out the value of recognizing and activating leadership outside of traditional adaptation professional roles.
- Better describing and articulating expectations for resolution of tensions and conflicts that may exist between principles as they are applied in real life scenarios.
- Thinking about how to optimize the structure and format of the Living Guide to be more conducive as a guiding document for adaptation practice; as a first step, better differentiating between the roles of values, beliefs, approaches, and strategies.
- Determining the role of the Living Guide in articulating the need for, and principles of transformative change.
- Better integrating Justice, Inclusion, Equity, and Diversity principles into the Living Guide.

Appendix 3: 2021 Update Summary

In February-March 2021, ASAP updated the Living Guide to better compliment the ASAP Code of Conduct and Professional Ethics and to more fully integrate justice, equity, diversity, and inclusion (JEDI) language and concepts.

To better compliment ASAP's Code of Ethics, ASAP extracted the Values and Beliefs from various sections of the Living Guide and consolidated them into one summary section which fully mirrors the extended Values and Beliefs section of the Code of Ethics.

The JEDI language and concepts integrated into the Living Guide came from ASAP's staff JEDI education, engagement with the ASAP member JEDI Committee, and from the Georgetown Climate Center Equitable Adaptation Legal and Policy Toolkit and the NAACP Our Communities, Our Power: Advancing Resistance and Resilience in Climate Change Adaptation - Action Toolkit. This part of the revision included:

- Revising language in all sections to conform with norms ASAP developed via the above resources/ engagements, including using asset-based framing whenever possible and using a specific definition for "communities on the frontlines of climate change."
- Integrating concepts and language from ASAP's Justice, Inclusion, Equity, and Diversity statement, which was adopted by the organization in April 2020.
- Revising the Principles section to include a principle addressing each concept -- justice, equity, diversity, and inclusion -- in a distinct manner.

To accomplish this work, ASAP staff collaborated with members of the Code of Ethics Working Group and the JEDI Committee Leadership team. Those ASAP members reviewed suggested changes to the Living Guide and the Code of Ethics, offered additional suggestions, and insights, and approved final changes to the changes in both documents. ASAP acknowledges and thanks those who participated in this update: Beth Gibbons, Josh Foster, Shameika Hanson, Sharon Hausam, Rachel Jacobson, Julia Kim, Vanessa Lueck, Kim Lundren, Susi Moser, Breana Nehls, Hugh (Gil) Peach, Kyle Sullivan, Lily Swanbrow Becker, Galen Treuer, and Emily Wasley.

ASAP Justice, Equity, Diversity, and Inclusion Statement

American Society of Adaptation Professionals

www.adaptationprofessionals.org

ASAP Justice, Equity, Diversity, and Inclusion Statement

Accepted: April 20, 2020

The urgent need to equitably adapt to climate change necessitates the removal of oppressive systems and requires a transformation into a society where we all share in the power and prosperity of resilient economic and social systems.

Grave injustices of the past, which have been allowed to perpetuate today, have created an unjust and inequitable society. Climate change exacerbates these inequities, as those who are the least responsible for climate change are often the most impacted.

Widespread discrimination, promoted by histories of colonialism, white supremacy, domination of nature, and economic exploitation have created systems that inhibit otherwise capable communities from thriving. These systems discount traditional systems of social care and ecological knowledge essential to achieving balance within the natural world.

These systemic injustices pervade the realities of the climate change adaptation field and the organizations within it, including ASAP. In order to use our power to achieve the necessary transformational change, we commit to deconstructing barriers in our membership structure and engagement model to become more inclusive and accessible–expanding the adaptation conversation at ASAP.We will support all frontline communities developingadaptation resources from their lived experience and traditional knowledge,and ensure that other adaptation resources are accessible and welcoming to all communities. Further, we will lift up stories of and empower leadership from communities and critical areas of adaptation practice which currently are poorly represented in adaptation leadership.

We will not allow the actions of the past to dictate our future and we commit to leveraging our network and resources to promote justice, equity, diversity, and inclusion in the climate adaptation field and beyond.

American Society of Adaptation Professionals

Climate Change Adaptation & Resilience Industry Segments

Adopted from**:** EBI Report 4800: Climate Change Adaptation & Resilience Markets

The U.S. climate change adaptation industry is just emerging, led mostly by consulting & engineering firms doing assessment and planning work, but also supported by analytical work to track data and frame scenarios. Climate change adaptation is one of nine segments under EBI's umbrella definition of the climate change industry. Below EBI offers a definition and overview of the emerging climate change adaptation industry and breaks out and quantifies the sub-segments that comprise that industry.

Specific Sectors of Work:

- Coastal building and reconstruction;
- Emergency response & preparedness systems
- Agricultural and natural resource adaptive management
- Water resource planning/ Utility/other infrastructure planning
- Relocation; Population transfer & redevelopment
- Consulting & Engineering: Assessment & Analysis;
- Planning; Design, Engineering & Construction
- Equipment & Systems: Analytical & Information Systems; Construction Materials & Supplies
- Climate Science & Studies: Government, Academic, Non-profit, Corporate, etc.
- Research & Development

Climate Change Adaptation & Resilience Services

- Climate & Resilience Risk Assessment & Analysis
- Climate Adaptation & Resilience Planning
- Adaptation & Resilience Design, Engineering & Construction

Disaster Services

- Disaster Risk Reduction
- Disaster Preparedness and Response Planning
- Disaster Response Contracting

Climate Adaptation & Resilience Equipment & Systems

- Analytical & Information Systems
- Construction Materials & Supplies

Climate Adaptation & Resilience Services	
Climate Risk Assessment and Analysis	Climate risk management is an approach to climate-sensitive decision making that seeks to reduce the vulnerability associated with climate risk. CRM involves strategies aimed at maximizing positive and minimizing negative outcomes for communities in fields such as agriculture, food security, water resources, and public health. Climate risk management covers a broad range of potential actions, including: early-response systems, strategic diversification, dynamic resource-allocation rules, financial instruments, infrastructure design and capacity building. In addition to avoiding adverse outcomes, a climate risk management strategy could also aim to maximize opportunities in climate-sensitive economic sectors--for example, farmers who use favorable seasonal forecasts to maximize their crop productivity.
Climate Adaptation Planning	Federal, state, regional and local landuse and municipal planning represent important channels to manage adaptation to climate change. Appropriate planning is recognized as central to avoiding the impacts of climate related hazards such as floods and heat stress, planning for demographic and consumption transition, water resources, and plans for ecosystem conservation. Local Climate Adaptation Planning is different from the National Adaptation Programs of Action (NAPAs) which are intended to be frameworks for prioritizing adaptation needs. At the local scale, municipalities are at the front line of adaptation where impacts are experienced in the forms of inundation, bushfires, heatwaves and rising sea levels, and the financial and human tolls taken by these and other factors. Cities planning for adapting to climate change include Chicago whose adaptation initiatives include changing to heat tolerant tree varieties, changing to water permeable pavements to absorb higher rainfalls and adding air conditioning in public schools. New York and other cities are involved in similar planning. Carefully planned water storage could help urban areas adapt to increasingly severe storms by increasing rainwater storage (domestic water butts, unpaved gardens etc.) and increasing the capacity of stormwater systems (and also separating stormwater from blackwater, so that overflows in peak periods do not contaminate rivers). Adaptation through local planning occurs in two distinct modes. The first is strategic planning, which fosters community vision, aspirational goals and place-making, along with defining pathways to achieve these goals. The second form is land-use planning, and is focused on the allocation of space to balance economic prosperity with acceptable living standards and the conservation of natural resources. These two types of planning are quite different in practice, and in many cases are managed by different departments. Significant constraints are recognised to hinder adaptation through planning, including limited resources, lack of information, competing planning agendas and complying with requirements from other levels of government. Planning for rising sea levels is one of the key challenges for local planning in response to climate change. Many national governments around the world have attempted to address the problem of rising sea levels through policy and planning

	reforms designed to increase adaptive capacity. In the United States, many state and local governments are now assessing innovative, locality-specific options for sea-level rise adaptation
Adaptation Design, Engineering, and construction	Once a climate adaptation plan is approved and possible solutions or preventive measures are approved and funding is put in place, project design, engineering and construction will occur similarly to other project areas. Projects may be as obvious as heightened levees or the construction of sea walls or dredging bays and harbors or expanding natural sinks or other measures to increase storm absorption capacity, or may be elements of more complicated or broad-ranging infrastructure projects in transportation, water, energy, facilities, etc.
Disaster Services	
Disaster Risk Reduction	Disaster risk reduction (DRR) is a systematic approach to identifying, assessing and reducing the risks of disaster. It aims to reduce socio-economic vulnerabilities to disaster as well as dealing with the environmental and other hazards that trigger them: Here it has been strongly influenced by the mass of research on vulnerability that has appeared in print since the mid- 1970s. It is the responsibility of development and relief agencies alike. It should be an integral part of the way such organizations do their work, not an add-on or one-off action. DRR is very wide-ranging: Its scope is much broader and deeper than conventional emergency management. There is potential for DRR initiatives in just about every sector of development and humanitarian work. The most commonly cited definition of DRR is one used by UN agencies such as UNISDR and UNDP: "The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development."
Disaster Preparedness and Response Planning	Emergency management is a public authority field, a group of professions and an interdisciplinary research field that deals with the processes used to protect populations or organizations from the consequences of disasters, wars and acts of terrorism. Emergency management doesn't necessarily extend to the averting or eliminating the threats themselves although the study and prediction of the threats is an imminent part of the field. The basic level of emergency management are the various kinds of search and rescue activity. Emergency management is independent of but closely interconnected with the fields of law enforcement and military. 1986 Chernobyl disaster in Ukraine and 2011 earthquake and tsunami in Japan were the most large-scale and cost-intense single instances of emergency management in history.
Disaster Response Contracting	Disaster response is a phase of the disaster management cycle. Its preceding cycles aim to reduce the need for a disaster response, or to avoid it altogether. The level of disaster response depends on a number of factors and particular situation awareness. Studies undertaken by Son, Aziz and Pen a-Mora (2007)

	shows that “initial work demand gradually spreads and increases based on a wide range of variables including scale of disaster, vulnerability of affected area which in turn is affected by population density, site-specific conditions (e.g. exposure to hazardous conditions) and effects of cascading disasters resulting from inter-dependence between elements of critical infrastructure”. In the US, the Federal Emergency Management Agency (FEMA) leads and coordinates response to major disasters, Among volunteers, the American Red Cross is chartered by Congress in 1900 to lead and coordinate non-profit efforts. They are supported by disaster relief organizations from many religious denominations and community service agencies. Licensed Amateur Radio operators support most volunteer organizations, and are often affiliated with the American Radio Relay League (ARRL).
Climate Adaptation Equipment and Systems	
Analytical and Information Systems	Monitoring climate change metrics and trigger mechanisms for various impacts is an early stage business and involves a variety of technology. Analysis equipment like LIDaR (LIght Detection and Ranging or Laser Imaging Detection and Ranging) is used as an optical remote sensing technology that can measure sea level and map possible outcomes of sea level rise. Basic instruments for temperature, pressure, precipitation etc. are increasingly in demand as are more sophisticated scanning, mapping and modeling systems and software
Construction Materials and Supplies	Dedicated hardware and equipment will be required to supply the many CCA projects expected to be constructed over the years. Much will be relatively generic existing materials and materials technology, but there will be opportunities for specialty items.

Advancing Meaningful Climate Action Through TCFD Disclosures

A brief study by WSP

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The COVID-19 pandemic continues to threaten the health and well-being of individuals across the globe, with associated economic impacts requiring businesses to re-engineer their business models and threatening the viability of many companies. Right now, the business and investment community is trying to weather this pandemic, as many consider it an immediate and acute shock to our system and a "black swan" event. The global pandemic is not a black swan event. Experts have been planning for this type of pandemic and other emerging threats for several decades; we just didn't know when it would affect us worldwide, and not everyone had the strategic foresight and economic wherewithal to proactively prepare for this type of event.

Meanwhile, climate change continues to intensify and impact business through intense heatwaves, forest fires, storms and flooding. This ongoing, systemic, and chronic crisis is something we have been tracking for decades and may have even greater long-term implications than what we are experiencing from this global pandemic. Strategically preparing for these emerging trends and the cascading impacts requires us to act now.

Investors, insurers, and underwriters are working hard to minimize losses from COVID-19 while managing the risks from climate change. We have seen that companies that take a proactive approach in managing environmental, social, and governance (ESG) issues have had greater resilience to the impacts resulting from the COVID-19 crisis. Similarly, we expect that companies that take early action to minimize climate-related risks and maximize climate-related opportunities will outperform those that have yet to assess and manage climate change and the various impacts on their business, strategy, and financial planning.

We conducted this study to help investors and other stakeholders better understand the climate-readiness of investee companies by leveraging their climate disclosures. Companies can use the findings in this report to understand how to better communicate with their stakeholders the important actions they are taking to align with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, transition to a more sustainable future, and enhance their overall resilience.

At WSP, we have a global team of experts specialized in climate change risk, resilience, and external ESG-related disclosures who work across sectors and regions. We help our clients assess, manage, and mitigate climate risks and opportunities, and develop and improve their disclosures. Please reach out to one of our experts if you would like to discuss the study or how we can help you preserve value in light of a changing climate.

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Executive Summary

Climate change is impacting businesses now and will only intensify into the future. At the same time, the transition to a low carbon economy is presenting new market opportunities. Investors, insurers, and other business stakeholders need a robust understanding of how these risks and opportunities will affect companies across their operations and/or portfolios, and the efforts of impacted companies and/or investees in responding and managing climate change impacts.

In 2017, the Task Force on Climate-related Financial Disclosures (TCFD) developed recommendations for climate-related financial disclosures applicable across sectors and geographies. Since the release, there has been a steady up-take of the TCFD requirements and the more recent years seeing the greatest increase. However, despite the increasing trend in disclosures by companies, investors and other stakeholders have found the disclosures to be limiting. Disclosures are frequently inconsistent and lack needed detail, making comparisons between companies and sectors difficult. To date, most TCFD disclosures are in standalone reports and climate change has not been included in mainstream financial filings.

"The results of this study help shed light on how companies and industries are progressing in their alignment with the TCFD recommendations. As a leader in climate action, we are actively exploring ways to enhance our sustainability and climate resilience practices, processes, and on-the-ground action. The analysis conducted through this study and the maturity roadmap discovered here gives us guidance on how to advance these actions and further align with the TCFD recommendations."

FORTUNE 50 COMPANY

WSP conducted a study of 50 TCFD disclosures cutting across multiple sectors and geographies, to assess the usability of disclosures by investors. We applied our proprietary TCFD Benchmarking Tool to score the quality of the disclosures. The aim of the study was to determine whether the climate-related disclosures could be used to indicate the level of maturity of a company in its response to climate change, and the level of action it is taking in response. Five key findings were identified:

THERE ARE SECTORS AND GEOGRAPHIC REGIONS WHERE DISCLOSURE IS LACKING:

The financial services and IT sectors were scored as the most advanced, whereas the renewables and service sectors scored the lowest (see Section 4 for the definition of sectors). Geographically, North America and Europe are leading, whereas the Asian region is lagging.

SECTORAL AND REGIONAL GAPS CAN BE TIED TO AN ABSENCE OF STRONG GOVERNANCE AND STRATEGIC FOCUS:

Most disclosures contained basic information on the organization's understanding of climate change risks, with little or high-level details of responsibilities for climate change management. In many cases, absence of formal governance structures or a defined climate strategy were perceived as barriers to more mature activities such as scenario analysis, metrics and targets, or integration into risk management activities.

FOUR PHASES OF MATURITY COULD BE IDENTIFIED WITHIN THE DISCLOSURES:

Based on the indicators within our TCFD Benchmarking Tool, we could allocate companies to one of four Phases of Maturity on climate disclosures. The phases are, in order of increasing maturity:

1. Understanding and addressing climate change;
2. Building capacity;
3. Mainstreaming;
4. Transforming sustainability and resilience.

The phases present a framework for investors to use TCFD disclosures as a tool for understanding whether a company is managing climate-related risks and opportunities. The Phases are described in greater detail in Table 3.3: TCFD Maturity Roadmap.

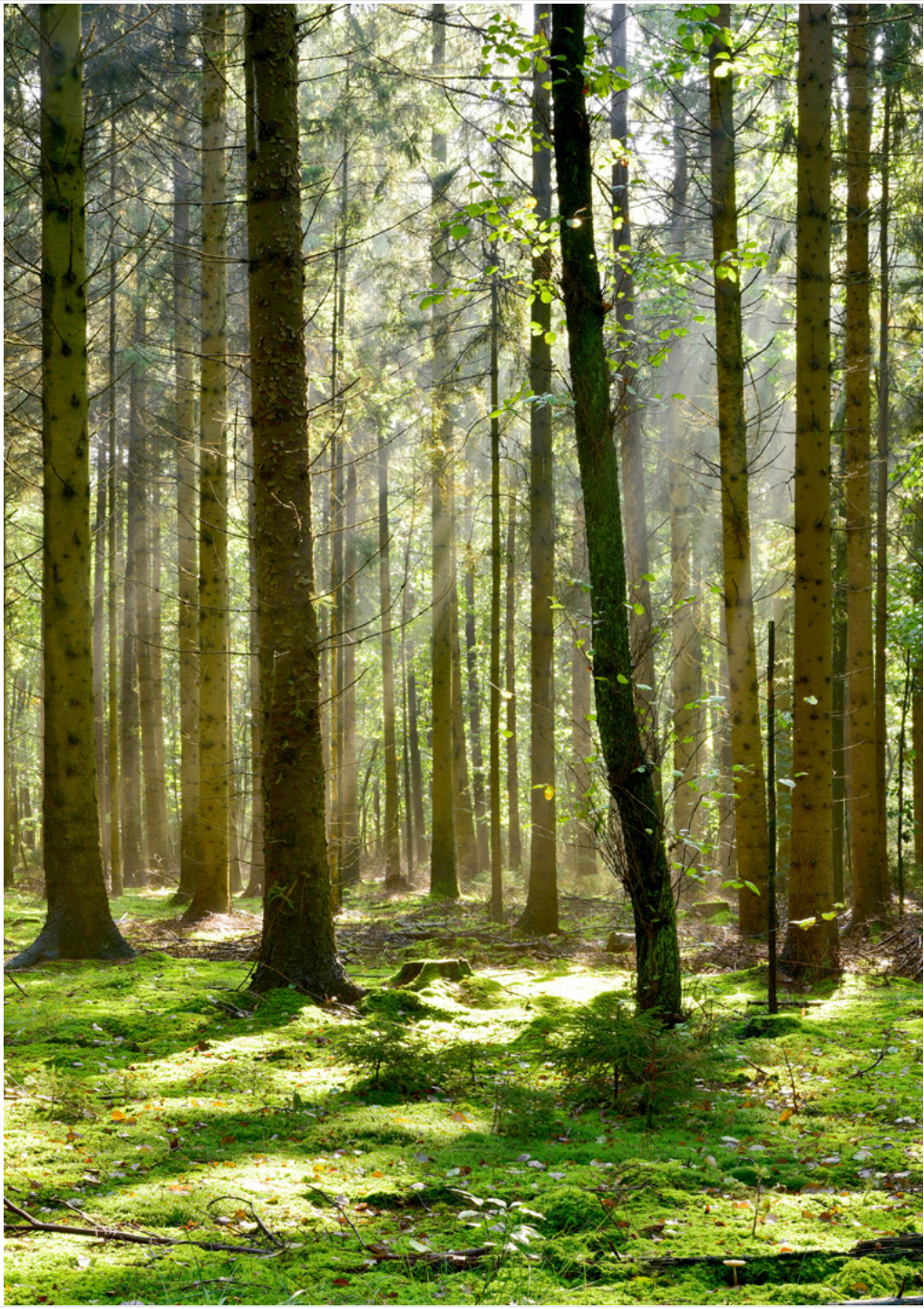
MOST COMPANIES WHO ARE DISCLOSING ARE AT THE LOWER LEVEL OF MATURITY:

Some companies are only just now understanding what climate change means to their business, while there are a select few taking concrete actions and truly enhancing their business to manage risks and opportunities related to climate change. However, we recognize that what is disclosed may not always be the full, "behind the scenes" story.

THROUGH THE PHASES OF MATURITY DEVELOPED WITHIN OUR BENCHMARKING TOOL, WE ARTICULATE A SET OF NARRATIVES COMPANIES CAN USE TO HELP UNDERSTAND HOW TO PROGRESS TO THE NEXT PHASES:

Leveraging WSP's phased maturity approach, companies can review their existing governance structure(s), strategies, enterprise risk management (ERM) and enterprise business continuity planning, and metrics and targets to assess how to advance to the next phase.

We further believe that the Phases of Maturity identified within this paper will serve as a tool to complement investors and other stakeholders as they assess the climate-readiness of investee companies using climate disclosures.



Introduction

THE NEED FOR CLIMATE-RELATED DISCLOSURES

The physical and transitional risks and opportunities related to climate change are already impacting companies, governments, and investors globally. With the ongoing global pandemic further straining individuals and companies around the world, a new focus on environmental, social, and governance (ESG) has emerged. We are seeing companies that are taking actions and reporting on sustainability to be faring more effectively and efficiently during the pandemic than those that have yet to invest in ESG-related activities. Major financial institutions such as BlackRock[1], State Street, and HSBC[2] have stated that assets that have greater ESG risk management have performed better during the pandemic.

The business and investment community agree: climate change has already impacted the global economy and will continue to have a profound effect on economies and financial markets in terms of risks and opportunities[4]. Many studies have suggested that the impact to the financial system will be in the order of trillions, perhaps tens of trillions of dollars, between now and the end of the century[5]. Institutional investors, who have a fiduciary duty to their clients to maximize risk-adjusted returns, need to understand the primary source for climate risk in their portfolio and how to mitigate or manage that risk. At the same time, the transition to a low-carbon economy presents market opportunities in sectors such as renewable energy and clean-tech, and investors want to be positioned to take advantage of those opportunities.

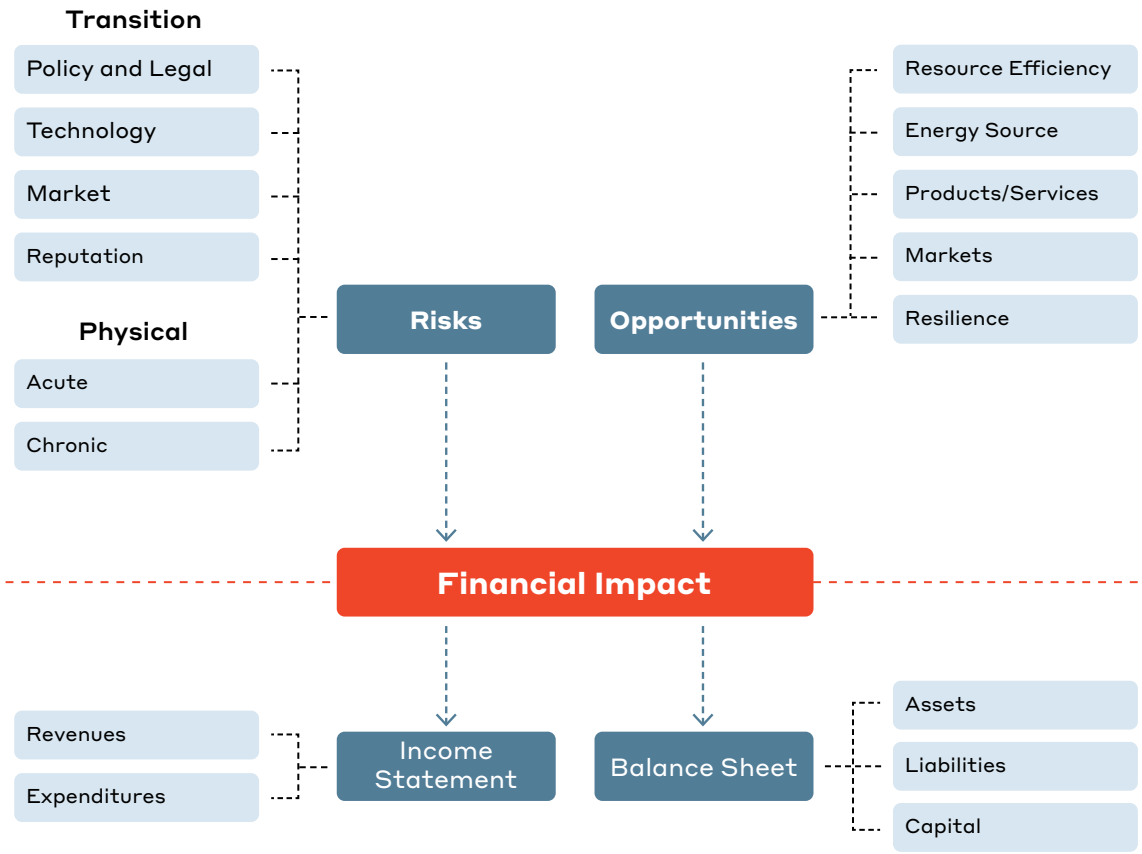
1. https://www.blackrock.com/corporate/literature/investor-education/sustainable-investing-resilience.pdf
2. https://www.gbm.hsbc.com/insights/global-research/esg-stocks-did-best-in-corona-slump
3. https://www.wemeanbusinesscoalition.org/about/
4. https://www.unepfi.org/net-zero-alliance/
5. Bank of International Settlements, 2020

Investors, underwriters, and insurers utilize disclosure (among other inputs) to understand risks and opportunities within their portfolios. At the same time, companies use disclosure to indicate to investors (and other stakeholders) that they are optimizing their business and making prudent risk management decisions.

There is a known gap in substance with regards to sustainability disclosures, including climate-related disclosures. Companies are too often disclosing their business-as-usual activities, and are not disclosing the impact of climate change on their business models[6]. Companies need to disclose the true sustainability of a company's strategy, business model, and management measures to enable stakeholders to assess the impact, and how a business is managing such impacts.

The TCFD was formed in 2015 to address the global gap in reporting associated with the transition to a low-carbon, sustainable, and resilient economy. Created by the G20's Financial Stability Board, it is comprised of financial institutions, preparers of disclosures, and other industry players. Their final disclosure recommendations were released in June 2017, with a primary focus on the impact on financial statements and the balance sheet (see Figure 1.1)[7]. The recommendations provide a framework for disclosing climate-related risks and opportunities, going beyond current practices in two significant ways: (1) inclusion in mainstream financial filings; and (2) using scenario analysis to inform business strategy.

Figure 1.1: TCFD Recommendations and Financial impact



6. EPA Center for Corporate Climate Leadership, April 2020 (Link)
7. The Final Recommendations of the Task Force on Climate-related Financial Disclosures

Figure 1.2: Developments in Policy Regarding Climate Disclosures

While the recommendations are currently voluntary in most jurisdictions, they are designed to drive consistent, forward-looking, meaningful, and decision-useful disclosures to help investors, companies, insurers and underwriters make informed capital allocation decisions over the short-, medium-, and long-term.

Since their introduction in 2017, support for the TCFD has grown quickly. As of February 2020, 1,027 organizations have committed to support TCFD[8]. Approximately 340 investors with nearly $34 trillion in assets under management are asking companies to report under TCFD. Major institutional investors, such as BlackRock and State Street, have signalled they expect investees to disclose in alignment with the TCFD recommendations and consider the risks and opportunities of climate change in their strategic and financial planning[9].

8. TCFD Status Report, June 2019
9. BlackRock Investment Stewardship's approach to engagement on the TCFD and the SASB aligned reporting, January 2020

ARE CURRENT DISCLOSURES DECISION-USEFUL?

While TCFD reporting is gaining increased support, the usefulness of that reporting is not yet clear. TCFD reporting to date does not provide clear information on whether organizations are adequately addressing climate risk and opportunities and does not indicate whether their business or financial strategies are resilient to the impacts of climate change.

Resilience to climate change is considered one of the more challenging TCFD recommendations to address and demonstrate. The TCFD suggests preparers conduct scenario analysis and provide insights on the resilience of business strategy and planning activities with regards to climate change, particularly a 2-degree, warming scenarios. Many organizations are beginning to work through scenario analysis, and there are multiple collaborative efforts to establish leading practices. However, the information disclosed to date on scenario analysis does not yet directly address the core question of whether or how a company's strategy will fare under various warming scenarios.

Despite these barriers, the key actions a company can take to increase its climate-readiness is becoming clearer. Companies are developing governance and risk management committees, strategic plans to manage climate-related risks and opportunities, and there are various sector-led initiatives where sector-relevant metrics and targets to track progress on risks and opportunities across a variety of time horizons have been developed and piloted. All these activities will provide the support and therefore focus by companies in preparing climate risk responses. However, the question remains: ***how can an investor use public reporting as an input to help determine whether an organization is adequately addressing climate risk and maximizing climate opportunities?***

When using current reporting, a meaningful assessment of a company's management of climate related risks and opportunities is not possible (for most organizations). This may change in the future as disclosures evolve and mature, particularly if governments across the world begin requiring TCFD disclosures. For now, investors and other stakeholders must rely on qualitative details provided companies in their TCFD reporting, to understand whether climate-related risks and opportunities are adequate — relying heavily on subjective judgement.

WHAT DO WE MEAN BY MATURITY?

How does an investor assess a company's maturity in managing climate change impacts in a consistent fashion across sectors, industries, geographies, and time horizons?

Organizational maturity speaks to the company's understanding of its risks and opportunities, the processes it has put in place to address them, and how it is measuring and tracking the impacts. More mature companies will have well defined, measurable activities and processes to identify, manage and disclose risks and opportunities.

The TCFD has four pillars: governance, strategy, risk management, and metrics and targets. A company can be advanced on one TCFD pillar but not the others. For example, a company can have a robust understanding of its climate risks; however, it may lack governance structures to oversee the assessment and management of these risks adequately. Can an investor use TCFD disclosures to explicitly assign an overall climate maturity to a company, or engage a company on how to improve its climate maturity?

We believe that some information exists within TCFD reports to do just this. While a full assessment of maturity is not possible as alluded to above, we believe that information within disclosures provides direction. We have used our proprietary TCFD Benchmarking Tool to conduct a study of 50 large market cap companies (across sectors and geographies) in relation to their climate-related disclosures. We find that that there is a clear distinction between companies within the study, and the distinction is related to maturity.

Study Approach

WSP'S BENCHMARKING TOOL

The study was conducted using WSP's proprietary TCFD Benchmarking Tool. The tool was developed considering the input of numerous direct client assessments, across multiple sectors, and various regions around the world. It has been deployed in our client work in multiple jurisdictions, and has been refined to reflect the maturity of our client's climate actions progress, the continued evolution of TCFD reporting, and increased ESG-related accountabilities by investors.

The Benchmarking Tool is comprised of over 70 qualitative indicators, with multiple indicators assigned to each of the four TCFD core elements and 11 disclosure recommendations. We review company disclosures, including TCFD or climate change reports, sustainability reports, ESG reports, annual reports, financial filings, CDP disclosures, or other disclosure vehicles to identify material that may directly address the TCFD indicators. Indicators are chosen based on our subjective judgement and experience working on TCFD disclosures and cover the direct requirements of the TCFD and additional indicators that provide insights into a company's activities to enhance its climate risk and opportunities. Table 2.1 below highlights some example indicators included in our tool to date. The list does not contain all 70+ indicators, as our tool is proprietary.

Table 2.1: Example Indicators from our TCFD Benchmarking Tool

Pillar	Recommendation	Example Indicators
Governance	Describe the board's oversight of climate-related risks and opportunities.	— Process for informing the Board/Board committees of climate-related issues / opportunities — Alignment of governance processes and controls for climate-related and financial information
	Describe management's role in assessing and managing climate-related risks and opportunities.	— A formal organizational structure of governance oversight and management responsibilities of climate-related risks and opportunities — Frequency of reporting by management regarding climate-related risks and opportunities
Strategy	Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	— Organizational exposure to each of the following: physical risk, transition risk, and opportunity, is described — A description of the timeframe of risks is provided
	Describe the impact of climate-related risks and opportunities on the organization's business, strategy, and financial planning.	— A description of the impact of climate risks and opportunities on strategy is provided — A process for prioritization and timing of climate risks/opportunities is provided
	Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	— Types of climate scenario analysis conducted or planned to be conducted are described — Time horizons, emissions scenarios, and other key methodological details are disclosed
Risk Management	Describe the organization's processes for identifying and assessing climate-related risks.	— Process for climate risk identification and assessment — Process for determining materiality (free from bias) and "substantive financial impact"
	Describe the organization's processes for managing climate-related risks.	— Assigned responsibilities for decision making to mitigate, transfer, accept or control climate-related risks — Categorization of risks into transition or physical
	Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	— Process for integrating risks into broader risk management activities — Process for establishing internal controls and assurance over climate risks

Pillar	Recommendation	Example Indicators
Metrics and Targets	Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	— Measurable climate adaptation and resilience metrics — Metrics assessing the integration of climate scenario analysis findings into strategic and financial planning processes
	Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	— Disclosure of GHG emissions over historical periods for trends analysis — Alignment with the GHG protocol methodology
	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	— Disclosure of targets, tied to strategy and scenario analysis — Disclosure of GHG, water, waste management, methane, renewable energy targets (as applicable)

METHODOLOGY

To conduct the study, we applied our proprietary Benchmarking Tool to the publicly available disclosures of 50 companies. The companies were chosen from the list of public supporters of the TCFD, ensuring a cross-section of industries and geographies are represented. Companies were selected in an arbitrary manner.

The following sectors were chosen for analysis:
- Financials
- Technology & Communications
- Transportation
- Extractives & Minerals Processing
- Infrastructure
- Renewable Resources
- Resource Transformation
- Services

The industry sectors are defined based on guidance provided by the Sustainable Accounting Standards Board (SASB), and are selected based on the companies currently supported by WSP in relation to TCFD, where we have in-depth understanding of the sector's maturity. The following sectors were not included in the analysis, as few companies in these sectors have disclosed sufficient TCFD-related / climate risk data or reports to allow adequate analysis. These sectors included:
- Food & Beverage
- Healthcare

The Benchmarking Tool was applied to the most recently available public disclosures (as of June 2020). We did not rely solely on TCFD reports to conduct our analysis, as many companies disclose climate-related information in multiple reports or documents other than dedicated TCFD reports. However, if a TCFD supporter had not provided any climate-relevant reporting as of June 2020, they were excluded from the analysis. Possible sources of information included:
- Annual reports or other financial reporting
- TCFD or Climate Change reports
- 2019 CDP reporting
- Sustainability or ESG reporting

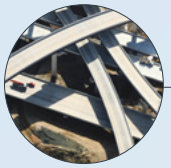
In the event of a discrepancy between available reporting within the same fiscal year, preference was given in the order of the disclosures as listed above. Disclosures released prior to the most recent report were not consulted, unless explicitly referenced by the recent disclosures.

The results were collected and analyzed, with the key findings presented in the next section.

Table 2.1: Example Indicators from our TCFD Benchmarking Tool

FINANCIALS

14

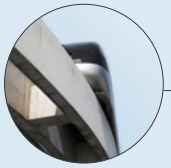


INFRASTRUCTURE

5

SERVICES

5



TRANSPORTATION

5

RESOURCE TRANSFORMATION

5

EXTRACTIVES & MINERAL PROCESSING

5

RENEWABLE RESOURCE

5

TECHNOLOGY & COMMUNICATIONS

6

Study Results

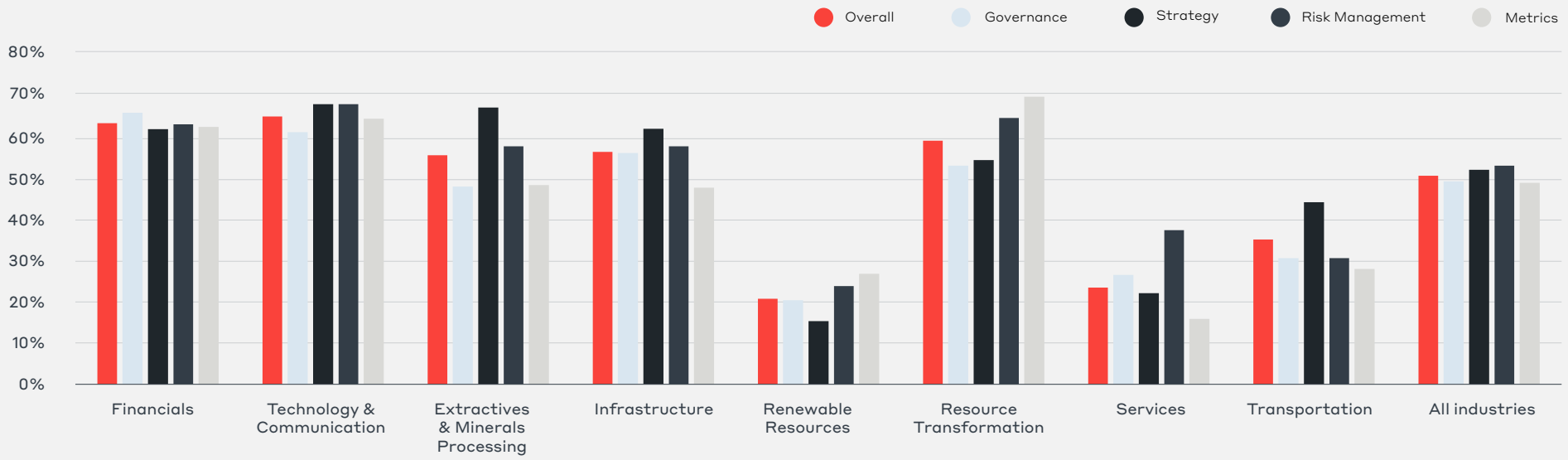
PRIMARY OBSERVATIONS

Our study reviewed TCFD disclosures and assessed how many indicators within our Benchmarking Tool the disclosures addressed. When a company effectively addresses more indicators, it has more robust disclosures with richer information available for stakeholders. As highlighted in our methodology section, our indicators are chosen to go beyond the TCFD recommendations and assess deeper elements of a company's management of climate-related risks and opportunities. When companies achieve more indicators in one TCFD pillar than others, they are most advanced in that pillar. The purpose of the study is not to look at individual companies in detail, but to address overall trends.

Figure 3.1 indicates sector-based performance across TCFD pillars. Generally, disclosures address 50-60% of indicators. Higher performing sectors identified included Financials and Technology, with Renewable Resources and Services representing poorer performing sectors.

There is low variability across the four TCFD pillars. On average, disclosures address very similar indicators in governance, strategy, risk management, and metrics and targets. This observation is true across industries. The results show that there are indicators that companies are frequently addressing, and some indicators that are frequently not addressed.

Figure 3.1: Overall results by sector



Key sectoral observations include:

THE FINANCIAL SERVICES SECTOR IS SETTING THE EXAMPLE:

At its onset, the TCFD was focused on the climate-related risks of financial institutions because they pose a systemic threat to the global financial system. Financial institutions rely on TCFD disclosure by investees to evaluate these risks. As such, they are dedicated to addressing their own climate risks and opportunities through disclosure.

THE TECHNOLOGY AND RESOURCES SECTORS ARE EXPERIENCING STRONG STAKEHOLDER PRESSURE

Technology, extractives, and resource transformation all received strong scores in our assessment. Disclosure by these entities is more developed due to the strong stakeholder pressure these sectors experience in relation to climate risks and opportunities.

RENEWABLE RESOURCES AND SERVICES ARE FOUND TO BE BEHIND IN DISCLOSURES DUE TO LACK OF STRONG GOVERNANCE AND RISK MANAGEMENT STRUCTURES:

Companies in these sectors lacked formal structures to manage climate-related risks and opportunities, thereby inhibiting more robust management of climate change impacts. There are many possible reasons for this. For the renewable resources sector, as companies in this sector are perceived as being inherently beneficial to the management of climate risk, they do not produce detailed reporting. However, this ignores the possibility that climate change will impact the renewable resource (or service) industry through physical impacts and that increased business opportunities due to climate change are not worth disclosing.

Similar observations are noted when assessing across geographies (Figure 3.2). The research indicates that companies perform evenly across the TCFD pillars. Particularly, the average pillar performance is very close to the overall geographic average. There are two key observations drawn from Figure 3.2:

COMPANIES FROM EUROPE AND NORTH AMERICA PERFORM THE STRONGEST,

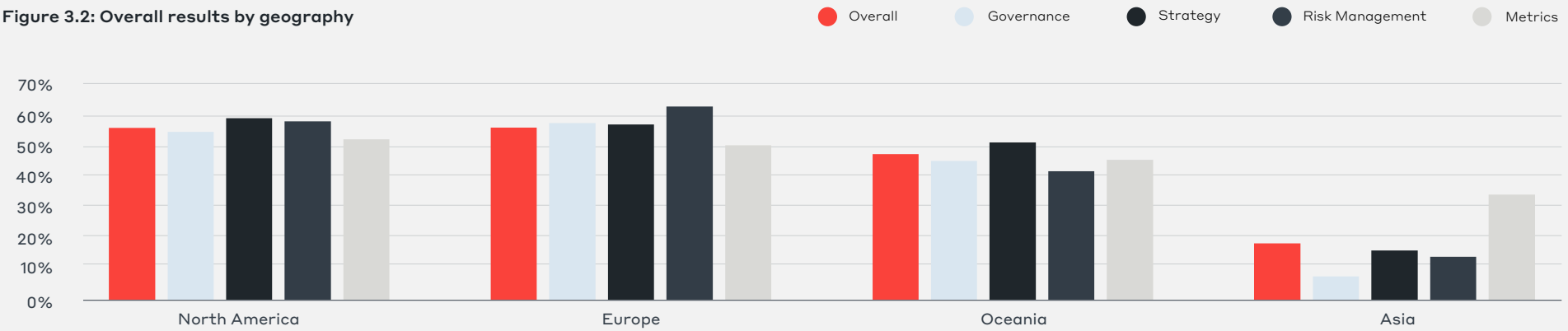
with Oceania just behind and Asia significantly behind. The results align with an understanding of these jurisdictions regulatory and stakeholder environments. In our experience, European and North American companies face the strongest stakeholder pressure to manage climate change, including disclosing against the TCFD.

IN THE ASIAN AND OCEANIC REGIONS, THERE IS REDUCED STAKEHOLDER AND CULTURAL PRESSURE

to disclose climate change risks. However, across Asia, the risk of impact from climate change is elevated compared to other regions and will likely drive the increase in focus and strength of climate disclosures[10].

10. Germanwatch Climate Risk Index 2020

Figure 3.2: Overall results by geography



These observations suggest that companies proceed through various stages in their response and level of maturity development with regards to their TCFD response. In reviewing the reports, a correlation became clear, where certain key thresholds needed to be met before more advanced indicators were achieved:

— Typically, if a strong governance framework were found to be in place, then it lead to the inclusion of an effective strategic or risk based improvements approach to climate change.

— Scenario analysis needed to be conducted before more advanced strategic improvements and advanced metrics or targets could be developed.

An additional observation made within the study was that only 8.5% of the companies surveyed disclosed meaningful climate-related information within their annual reports. The majority disclosed climate information in dedicated TCFD reports, sustainability reports, or CDP reporting. Companies generally did not indicate whether they intended to disclose in mainstream financial filings in the future.

In the next section, we explore some interesting patterns we observed in our data and how they can be useful for understanding a company's overall maturity.

UNDERSTANDING LEADING INDICATORS AND IDENTIFYING PHASES OF MATURITY

We considered the indicators in our research and asked how frequently each indicators was addressed by companies in the study. It became immediately clear that some indicators were frequently addressed, while others were rarely addressed.

We noticed some indicators were addressed by 80% of the companies analyzed (or more), with many of these indicators attributable to activities that companies may conduct at the beginning of their TCFD journey (such as identifying risks or calculating GHG emissions). Further, there were indicators addressed by 33% of companies or less, which represented what we considered 'advanced activities'. These included tracking metrics for climate resilience. Two other groups of indicators were identified between the two extremes. We labelled the four groups as four "Phases". The choice of labelling each as a "Phase" is on the qualitative observation that they are implicitly tied to TCFD maturity. See Table 3.3 for details.

Table 3.3: TCFD Maturity Roadmap

	BASIC	IMPROVING	MATURE	LEADING
	Understanding & Assessing	**Building Capacity**	**Mainstreaming**	**Transforming Sustainability & Resilience**
Governance	– Identify specific Board and/or management committees responsible for climate, ESG, or sustainability risks and opportunities – Integrate climate-related risks and opportunities into governance discussions on a case-by-case basis	– Integrate climate-related risks and opportunities into governance discussions and decision-making on a regular basis – Establish a process for reporting climate information to management and the Board – Appoint an executive, C-suite lead to oversee climate issues including physical and transition risks and opportunities	– Establish a process and frequency of regularly informing the Board and management on climate-related risks and opportunities – Ensure that the Board and executives provide input into the assessment, prioritization, and transfer of climate-related risks and opportunities for further evaluation	– Integrate climate-related risks and opportunities into the ESG or corporate sustainability policy, strategic business decision-making, and financial planning – Provide monetary incentives for senior executives and management on progress towards achieving climate-related targets and metrics
Strategy	– Identify baseline operational greenhouse gas (GHG) emissions and climate hazards – Identify specific physical and/or transition risks and opportunities at a high level – Establish short-, medium-, and long-term time horizons for potential climate-related risks and opportunities	– Qualitatively assess organizational exposure to physical and transition climate-related risks and opportunities at the portfolio level and for key suppliers – Examine qualitative impacts of identified climate risks and opportunities on the organization's strategy and financial planning	– Conduct a quantitative scenario analysis, including the 2°C climate scenario, at the portfolio, asset, and supplier levels – Examine quantitative impacts of risks and opportunities on business strategy and financial planning – Identify climate resilience solutions to build organizational adaptive capacity	– Conduct a quantitative scenario analysis, across the entire value chain – Align business strategy and financial planning with market transformation – Establish internal carbon pricing and climate resilience strategy – Advocate for climate change action through public forums and collaborations
Risk Management	– Assign responsibilities to groups or individuals for overall risk management, including climate change – Establish processes for identification, qualitative assessment, and management of climate-related risks and opportunities on a case-by-case basis	– Establish processes for identification, qualitative assessment, and management of climate-related risks and opportunities – Establish a process for determining materiality of climate-related risks and opportunities in relation to enterprise and other ESG risks – Conduct regular materiality assessments	– Integrate climate-related risks and opportunities into a broader enterprise risk management (ERM) program and align with broader business strategy and goals – Quantitatively assess risks and opportunities in the context of other business risks – Establish a process of internal control, validation, and assurance of climate risks	– Consider establishing enterprise risk and resilience management program covering operations and value chain – Engage in public forums and stakeholder collaborations to expand risk management across the value chain engaging host communities, customers, and other key partners
Metrics & Targets	– Develop annual GHG inventory covering Scope 1, Scope 2, and some Scope 3 GHG emissions – Develop annual water and waste inventories – Establish science-based GHG reduction targets	– Annually measure and report Scope 1, Scope 2, and all applicable Scope 3 emissions – Establish energy, water, waste, and/or land use reduction targets, if applicable – Develop metrics to measure adaptive capacity and resilience and explore a resilience target	– Annually verify the GHG inventory under internationally recognized assurance standards – Establish targets around sustainable finance and/or renewable energy investment – Establish and track Key Performance Indicators to monitor progress towards enhancing adaptive capacity and resilience	– Verify GHG reduction targets under the Science-Based Targets initiative (SBTi) – Align the targets with scenario analysis and strategic planning process – Establish climate adaptation metrics, transition risk and opportunity metrics (e.g., divestment from fossil fuels and investment in carbon removal)

Each of the Phases in Table 3.3 could therefore represent different 'Phases of Maturity' that companies achieve in their TCFD journey. The list below highlights the narrative that emerges in the groups identified in the above analysis:

PHASE 1: BASIC

Understanding and Assessing: Identification and understanding of climate risk. Companies are just beginning their TCFD journey, and have disclosed existing processes and knowledge on climate change. Many now use the TCFD framework to outline their GHG emissions profile and targets.

PHASE 2: IMPROVING

Building Capacity: Companies are beginning to update their governance and risk management processes and building their capacity to manage climate-related risks and opportunities on a long-term basis.

PHASE 3: MATURE

Mainstreaming: Companies have developed and implemented updates to processes and policies. They have conducted one or more different scenario analysis and are beginning to understand the material risks to their organization. They have a climate plan, inclusive of metrics and targets to support monitoring of the plan.

PHASE 4: LEADING

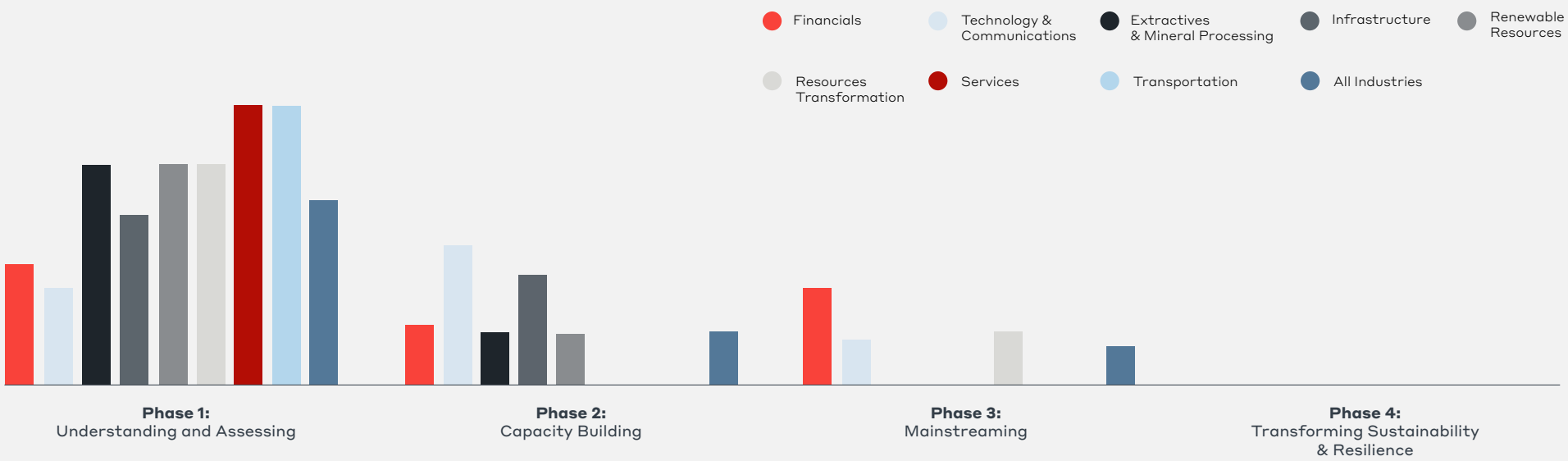
Transforming Sustainability and Resilience: Companies have begun to address adaptation and resilience and to transform to become resilient. Companies have also implemented internal control framework to support effective governance and risk management activities in relation to climate change.

We must be clear that the Phases of Maturity are not determinative of the ability of a company to adapt and be resilient to the effects of climate change (physical or transition). Only an in-depth analysis of the company, beyond disclosures, can provide that insight. We anticipate conducting follow-up studies where the framework developed here is combined with in-depth company assessments to validate the findings and enhance the model.

The analysis and framed four phases of maturity described above was then used and applied to the companies in our study. The results can be found in Figure 3.4. Through this analysis, a company must satisfy >2/3 of the indicators in a Phase (for each of the TCFD pillars) to proceed to the next Phase.

As would be expected, the majority are in Phase 1 — the early stages of considering and responding to climate change risk / opportunities in the TCFD context. However, as evidenced, the financial services and technology industries hold the highest number of companies that fall into Phase 3. No company in the analysis achieved Phase 4.

Figure 3.4: Applying the Phases of Maturity to Companies



Key takeaways:

MOST DISCLOSING COMPANIES ARE AT THE LOWER LEVEL OF MATURITY:

Some companies are only now understanding what climate change impacts mean to their business, while there are select few taking concrete actions and truly enhancing their business resilience to the physical and transition impacts of climate change. This is largely because progressing through the Phases takes time, and most companies have only been making progress for a couple of years. We expect to see greater average maturity in future years.

THE RESULTS OF THE ADVANCED DATA ANALYSIS ALIGN WITH THE PRELIMINARY CONCLUSIONS:

The results suggest that the financials services and technology sectors have the most advanced disclosures, as demonstrated in Figures 3.1 and 3.4. This agrees with the observations made previously in Figure 3.1 and is primarily driven by the strong stakeholder pressure within those industries and the general culture of innovation.

UNIQUE INSIGHTS ARE NOTED:

While the results generally align with a more cursory review of the data, the Phases of Maturity reveal some additional insights. Notably, the financial services sector has several companies in Phase 3. In our observations, through advising many in the financial services sector, financial institutions are most likely (at this point in time) to have implemented more robust governance processes and conducted deeper scenario analysis (particularly through industry pilots).

Further, while extractives and minerals appeared comparable to financials services and technology and communications, when applying the Phases of Maturity approach, it became clear that most companies were still in their infancy in disclosures (e.g., so more disclosing but without the level of detail and sophistication as those in the financial services sector) . We believe that companies in this sector may be addressing many indicators, but due to a lack of deep structural change and commitment to building climate resilience there appears to be no drivers for advancing increased disclosure.

NO COMPANY IN THE ANALYSIS HAS FULLY REACHED PHASE 4:

While companies addressed some indicators consider to be that of a phase 4 maturity, no one company was found to address the sufficient number of indicators to demonstrate Phase 4 maturity. This is not unexpected, as the TCFD recommendations were only released just over three years ago. It will be interesting to watch whether increasing interest in TCFD disclosures drives not just more disclosures, but more advanced, detailed and sophisticated disclosures.

Just as the framework was useful in differentiating between the relative maturities of industries, we believe it will also be useful in differentiating maturity between individual companies helping investors and stakeholders make informed investment decisions. Further, it can be useful to help companies understand how to advance their TCFD disclosures, which is discussed in the next chapter.

Improving Maturity

The goal of the TCFD is to allow investors to make informed capital allocation decisions. However, rather than removing poor climate-performing companies from the portfolio, many investors prefer to engage investees and work together to drive improvements.

The four Phases of Maturity identified in Chapter 5 presents a useful framework for allowing investors to understand the maturity of their portfolio companies, and to improve the management of climate-related risks.

This section outlines a narrative for understanding the activities and thought processes of companies in each Phase of Maturity, and actions that a company can take to advance to the next Phase. The narrative is designed to describe a company in any sector or geography. These narratives are informed by our experience in working with investors and companies across sectors around the world.

Table 4.1: Understanding Phases of Maturity

Phase 1: **Basic**	**Companies in this Phase are ...** ...understanding their context and just getting started. They understand implicitly that climate change is a material risk to the organization, and that it presents a possible source of business opportunity. It may be the case that the company already makes significant efforts to manage the impacts of climate change, but those activities are not centralized and/or not described coherently through disclosure. No formal structures at the board and/or executive management are in place to provide oversight and support climate risks management activities within the company. However, it is likely a risk or sustainability-related committee dedicated to environmental and social issues which indirectly addresses climate change risks is in place, but not in a direct or well-informed manner. Similarly, they have a high-level of understanding of the climate risks and opportunities facing the organization. However, no detailed analysis has been conducted. It is likely that they already disclose GHG emissions through a sustainability report and/or other regulatory reporting format / requirement.
	To improve maturity, companies should ... ... focus on governance and identify what they need to do to manage climate-related risks and opportunities. In particular, they should understand what requirements and comfort investors are seeking in relation to the identification and management of climate risk impacts. They should benchmark the disclosures of their peers. A key first step needs to be implementation of a sound governance model. Clear tone from the top and accountabilities will help demonstrate to the company and its stakeholders that climate impacts are being taken seriously. Further, companies should begin preparing their first set of climate change related disclosures leveraging relevant framework, guidelines, with a primary focus on TCFD. The act of compiling the report will help in identifying and engaging the right teams, understand what is currently being done on climate change, and where the potential gaps may exist.
Phase 2: **Improving**	**Companies in this Phase are ...** ... establishing the necessary structures to enable strong management of climate-related risks and opportunities. This is perhaps the longest and most contentious Phase, as it can involve structural changes that take time and require detailed buy-in. Board committees and the executive committee are formed. The process of how these committees will address climate related issues is in the process of being formalized. The board and management undergo extensive education in relation to climate change and how it impacts the company and society as a whole. The specific climate-related risks and opportunities are studied in detail. Climate change physical and transitional risks are clearly articulated, as well as the opportunities, both on a sectoral and geographical basis (where applicable). The possible impacts on strategy and financial planning are understood qualitatively. Companies in this Phase have begun to prepare to conduct a climate change assessment through the use of scenario analysis. They are likely consulting with internal teams to understand what data is available and which scenarios are most relevant given corporate strategies. Their risk management team establishes processes for climate risk identification, monitoring, and mitigation activities. Key roles and responsibilities are established for monitoring climate risks. Metrics are beginning to be developed, particularly those for opportunities as they will become key internal tools to build consensus and provide business case for increased internal focus and support.

	To improve maturity, companies should ... ... keep building on the momentum. In entering Phase 2, the company recognizes that this is important and that action is necessary. This is a difficult stage — so the more education and training that can be provided at all levels, the better. Keep engaging teams, an keep them updated on the risks and how peers and competitors are responding and evolving to the risks. As processes and procedures start to put into place, keep evolving them to become robust and enhanced. Further, companies should begin to develop measurable and quantitative approaches to managing climate risks and opportunities. In addition, companies should begin exploring how to disclose climate-related information in mainstream financial disclosures.
Phase 3: **Mature**	**Companies in this Phase are ...** ... finalizing and fully integrating their climate plans. They have detailed processes for informing the relevant board and management committees on climate matters, including details on the frequency of reporting and the internal controls over climate-related data. Companies have a process for monitoring how climate change is impacting the organization, and the emergence of new risks and opportunities and the impacts on society. They have conducted a detailed scenario analysis and established organizational resilience to climate change. The scenario analysis informs strategy and risk management activities. There is a program for tracking climate risks and opportunities through metrics and targets, with advanced programs to managing climate change impacts for example establishing an internal carbon price. Meaningful climate-related information is disclosed in mainstream financial reporting.
	To improve maturity, companies should ... ... begin considering the long-term evolution of the climate change plan. This includes looking to develop stronger metrics and targets, aligned to scenario analysis and beginning to develop an approach to building climate resilience.
Phase 4: **Leading**	**Companies in this Phase are ...** ... building their resilience and adaptive capacity to the physical and transition impacts of climate change. Beyond understanding the risks and opportunities, companies are ensuring that the correct actions are being taken to minimize risks and maximize opportunities over the long term. The scenario analysis is adapted to consider how the company's adaptive capacity improves over the long-term outcomes. Companies have developed metrics and targets specifically tailored to adaptation. Further, they have formalized governance and risk management processes with robust internal controls over the information being used, and the accuracy of the programs.
	To maintain maturity, companies should ... ... stay vigilant and constantly monitor the impact of climate change. Further, continue to monitor investor expectations, broader stakeholders and peer activities for evolving practices. Update the climate plan and reporting in alignment with normal 3-5 year business planning cycles. Investor expectations continue to increase, and leading firms must innovate to maintain their leadership.

It is possible that a company will not necessarily see every aspect of itself in each of the phases described. While our data suggests many companies fall within distinct Phases based on the level of activities and/or disclosures, each company's experience will be unique.

Overall, we believe this analysis demonstrates that aligning with the TCFD recommendations may seem daunting, but there are actions you can take today to leverage processes already in place.

This paper introduces our discovery of the four Phases of Maturity. We expect TCFD disclosures to increase in volume and maturity over time, which will give us greater insight on how the 4 Phases apply. In future work, we intend to answer questions such as:

— Which Phase is most difficult to complete?

— On average, how long does each Phase last? Are there specific sectoral considerations?

— Should all companies strive for Phase 4?

— Do any of the Phases require or are highly impacted/reliant on external factors such as regulatory development or industry collaboration?

At WSP, we work with companies and investors to assess climate risk and opportunities, build resilience, and facilitate effective disclosure. The next section will outline how we help investors and companies understand maturity, and move to the highest Phase.

QUESTIONS FOR INVESTORS AND BOARDS

As more and more stakeholders become concerned about climate risk and opportunities for a company, more will be asking questions to try and understand a company's management of climate change. Here are a few questions an investor or a board member can ask of a company to assess its climate-readiness:

GOVERNANCE:

- Are there individuals or a committee explicitly responsible for climate change at the board or executive management levels?
- Is there a clear and robust process for the board and management to receive and assess climate-related information?

STRATEGY:

- Has the company assessed physical and transitional risks, as well as opportunities? What is the relevant timeframe for these risks / opportunities?
- Does the company know how climate change may impact financial and business planning?
- Is the company conducting scenario analysis to test resilience? is it considering physical and transitional risks, under business-as-usual and Paris-aligned scenarios?

RISK MANAGEMENT:

- How is the company tracking and managing climate-related risks?
- Are climate-related risks incorporated into traditional risk-management processes? Is climate change considered material? If climate change is not considered material, what is the rationale?

METRICS AND TARGETS:

- Are metrics used to track climate impacts that are tied to key risks and opportunities, as well as scenario planning?
- Is the company using targets that help the company to achieve alignment with the Paris Agreement?

WSP's Global TCFD Practice

WHO WE ARE

At WSP, we work with leading international investors and companies on their climate risk, resilience, and disclosure programs. WSP is one of the world's leading professional services consulting firms. We are strategic advisors and technical experts with an expansive global network of trusted consultants, engineers, scientists, project managers, planners, and environmental specialists, as well as design and program management professionals. With over 43,000 globally, we deliver strategic advice that will help investors and companies grow for decades to come.

WSP is committed to helping make investors and companies Future Ready® through our work. Future Ready® is an innovative program that enables our staff to see the future more clearly and design for it today. Through Future Ready®, we deliver project solutions that support a prosperous, resilient, resource-efficient future.

OUR SERVICES

We have experience leading organizations at all stages of their maturity. Our services are designed to help organizations improve their climate risk and disclosure programs informed by climate science and emerging best practices. Our advice is informed by experts, including climate scientists, climate engineers, architects, and designers. We partner when necessary with leading climate science institutions and international thought leaders to bring leading practices to our clients.

"Through our Climate Risk and Resilience (CR+R) work with WSP, we have been able to establish a bold, industry-leading CR+R framework, while aligning this work with our existing ESG and Enterprise Risk Management infrastructure. As a function of this work, WSP also supported us in assessing our TCFD and SASB alignment efforts and assisted us I developing a clear roadmap to alignment that will further strengthen our ESG leadership.

FORTUNE 50 IT COMPANY

TCFD BENCHMARKING AND GAP ANALYSIS

We look at the disclosures produced by your industry peers and competitors, and identify leading practices within your industry. We leverage our proprietary Benchmarking Tool, used in this study, to identify common indicators and practices.

Further, we use our Benchmarking Tool to establish the gaps in your existing climate change or sustainability disclosures and areas of enhancement.

While benchmarking can be useful at any stage of the TCFD journey, it is particularly useful for organizations at Phase 1. Our benchmarking and gap analysis enhances your understanding of what you need to do to enhance your climate disclosures, thereby advising your climate risk and disclosure framework more broadly.

CLIMATE RISK AND OPPORTUNITY ANALYSIS

We apply our understanding of climate science, policy, economics, and climate solutions to help identify your top climate risks and opportunities.

We apply climate scenario analysis to help test the resilience of your organization to multiple scenarios, including a 2-degree scenario.

We help you to identify your top climate-related risks and opportunities, and to quantify the impact. Further, we have developed metrics that not only measure risk, but also resilience to climate impacts as well as progress on climate opportunities.

MATERIALITY ASSESSMENT

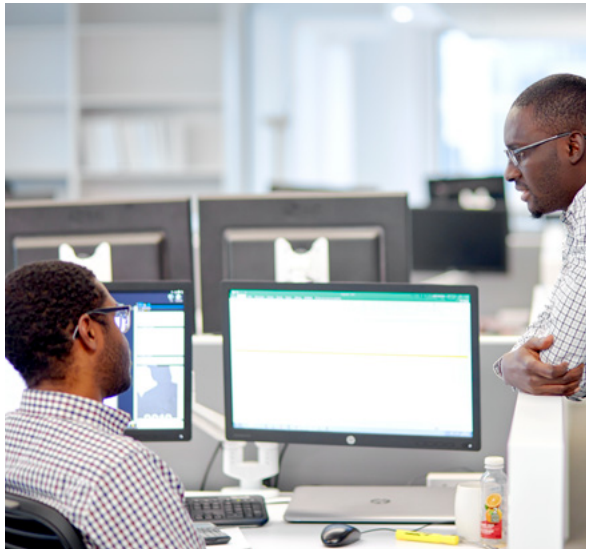
We help identify, assess, and prioritize climate-related issues important to an organization and its stakeholders, in alignment with the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and other frameworks.

We help in identifying and consulting stakeholders on sustainability report focus and content, including engagement aligned with GRI or SASB materiality assessment process.

TCFD ROADMAP AND DISCLOSURE

We co-design a feasible and integrated TCFD roadmap with actionable steps to achieve the goals and targets set to operationalize sustainability and climate resilience across your organization (with critical business functions such as enterprise risk management, business continuity planning, financial management, asset management, procurement, operations, product or service development, investor and customer relations) and within the communities where employees live and work.

We develop content appropriate across relevant reporting and disclosure frameworks, with goals to communicate progress, increase transparency, minimize reporting burden, and improve the quality of reporting for the benefit of investors and other stakeholders.



METRICS AND TARGETS DEVELOPMENT

We help identify decision-useful metrics and targets to track your climate progress through our understanding of your company and how it will be impacted by climate change. The metrics and targets are informed by your scenario analysis and organizational strategic goals.

The metrics and targets will help you make strategic decisions including asset allocation and strategic investment.

ADAPTIVE CAPACITY AND RESILIENCE ASSESSMENTS

We help you identify and understand risks and adapt to them, minimize their impact, and take maximum advantage of opportunities.

We bring in a team of experts — from engineers, scientists, designers, architects — to help build resilience to all asset types and aspects of the company, through site visits and desktop research. For example, we look at your physical assets and assess their structural integrity to climate change. Further, we look at your business model to assess the impact of the transition to a low carbon economy.

WSP's Global TCFD Practice

WSP operates a Global TCFD Practice with experts around the world, working with leading institutions. We readily share knowledge and experiences, allowing our team to bring both a local and international perspective to our client engagements.

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As one of the world's leading professional services firms, WSP provides engineering and design services to clients in the Transportation &Infrastructure, Property & Buildings, Environment, Power & Energy, Resources and Industry sectors, as well as strategic advisory services. WSP's global experts include engineers, advisors, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. Our talented people are well positioned to deliver successful and sustainable projects, wherever our clients need us.
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