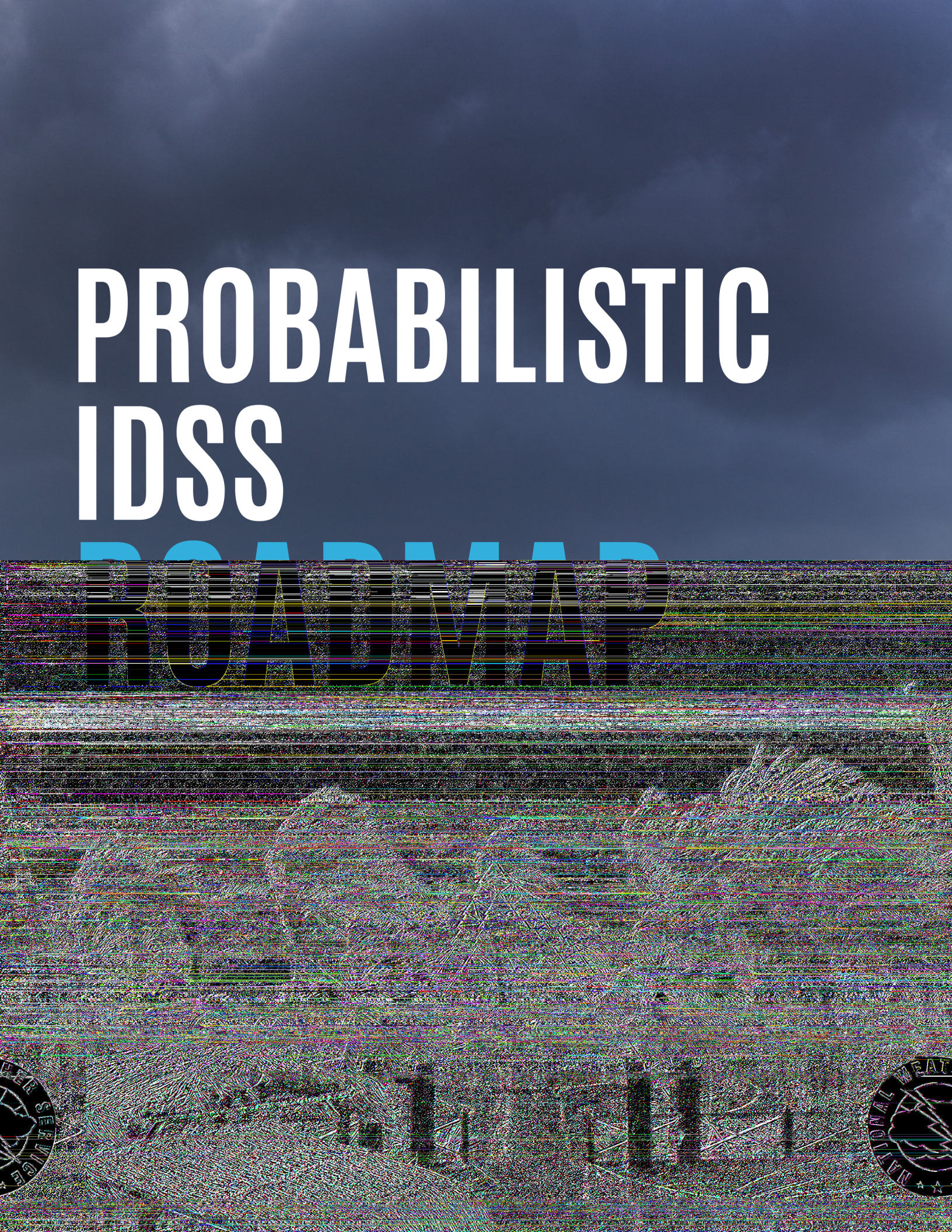
PROBABILISTIC IDSS ROADMAP



The Probabilistic Impact-based Decision Support Services (IDSS) initiative envisions a future expanded role for NWS

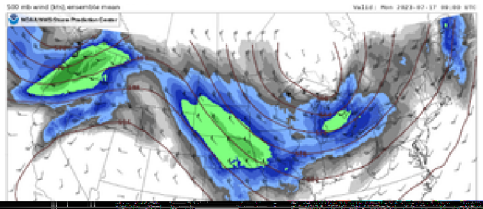
staff providing decision makers and communities with comprehensive range of possible outcomes to support critical decisions regarding high impact weather, water, and climate related events.

Based on support of the National Weather Service (NWS) Strategic Plan 2020-2030 and Transformation Roadmap, Probabilistic IDSS is an essential part of the agency strategy that will enable the agency to prepare our core partners, communities and individuals to take protective actions as early as possible in the face of hazardous weather and flooding.

Communities we serve are complex, each sharing a unique set of weather ready challenges that factor into social vulnerabilities. Compared to the majority of communities in the United States, the most vulnerable experience excess weather related deaths and property damages. Impact conservatively at $500 annually. Accurate deterministic forecasts are no longer to assure that everyone experiences a positive outcome when threatened by hazardous events such as tornadoes and damaging winds or massive winter storms. To account for this complexity, NWS core messaging as well as decision support services to emergency managers must be delivered in a calibrated and easy to understand framework in order to reduce the disproportionate impact of these events on vulnerable populations. In the Priorities for Weather Research Report, the NOAA Science Advisory Board highlighted the importance of better understanding the nature and needs of the communities we serve, and to deliver our forecasting weather information according to those needs in the most effective manner.

To fully realize our Probabilistic IDSS vision, we will develop a partner-focused workforce and operations model that is enabled by continuous data, advanced interpretive tools, and a One NWS culture based on trust and teamwork.

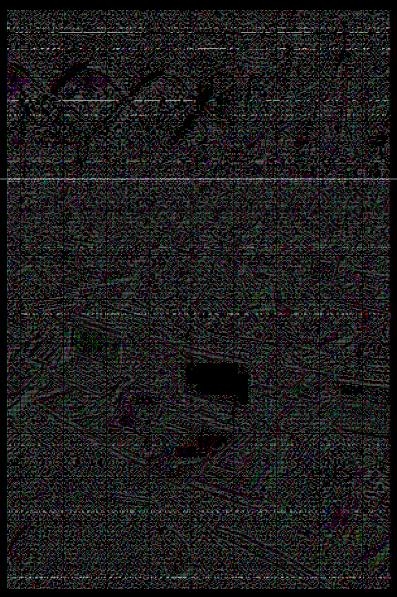
KEYS TO ENABLING PROBABILISTIC IDSS



Foundational probabilistic data of such high quality that our scientific experts do not need to modify it. This will give our experts enough

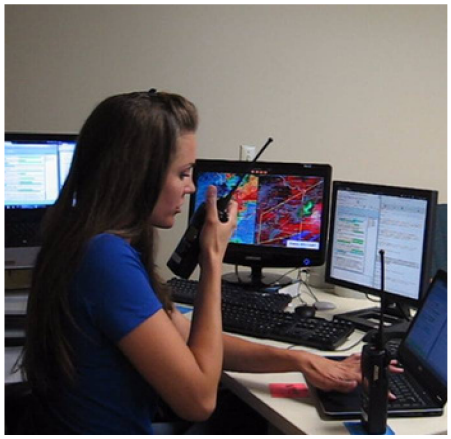
[illegible]

A portable, dynamic, appropriately engineered, and operationally supported system integrated across all field entities allowing our scientists to visualize, interrogate, and disseminate this probabilistic information.



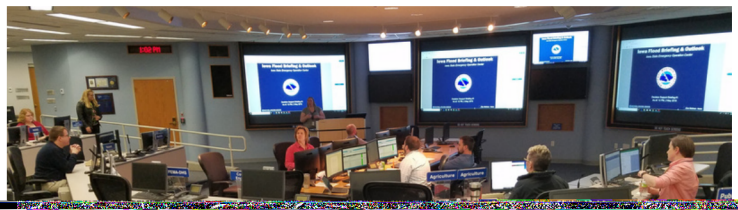
An organizational culture and capacity that empowers our workforce to build strong relationships with our Core Partners so w what decisions our partners are making, imp thresholds, and time sensitivities.

We will ask questions informed by social scie data such as, "What decisions do you need make?" not "What services do you want?".



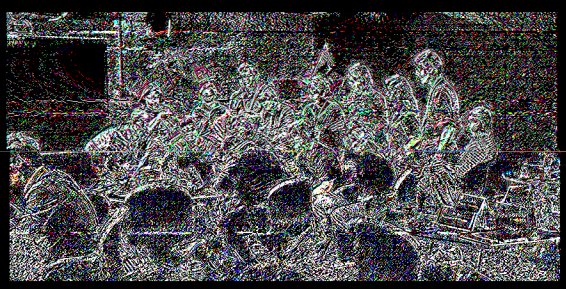
Scientists who can **identify and interpret** meteorological, hydrological, climatological, and other environmental phenomena, and their potential **impacts**, and communicate in a way that relays the most likely outcome, while still conveying uncertainty in a way that is **clear to the decision maker**.

An **operating model** that prioritizes and enables scientists to support decision makers in an



A framework to implement a robust, reliable feedback loop between our users and our scientists to continuously improve our data and services. Environmental and social, behavioral, and economic science (SBE-S) data is used to assess both the quality of our forecasts and user decisions to ensure we are meeting our mission.

A robust, continuous training model which allows our workforce to learn from past hazardous events, test and implement improvements and get repetitions in operational settings with our partners.



GOALS & KEY OBJECTIVES

GOAL

Provide Foundational Data to Support the Next Generation of Service Delivery

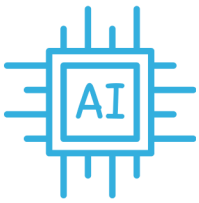
Develop and support high quality, broad-scale weather, water, and climate data to provide the best possible information for decision making. This will enable operational scientists to focus their efforts on analyzing and communicating this information to support our partners.

KEY OBJECTIVES

Centrally host our weather, water, climate and SBES information in an accessible, reliable **data lake.**

Generate the highest quality **Earth Modeling System** with advanced ensemble prediction capabilities to support the generation of skillful probabilistic guidance.

Produce a **next generation calibrated suite of model-integrated and post-processed guidance.**



Leveraging the **best new scientific techniques available**, including Artificial Intelligence where appropriate.

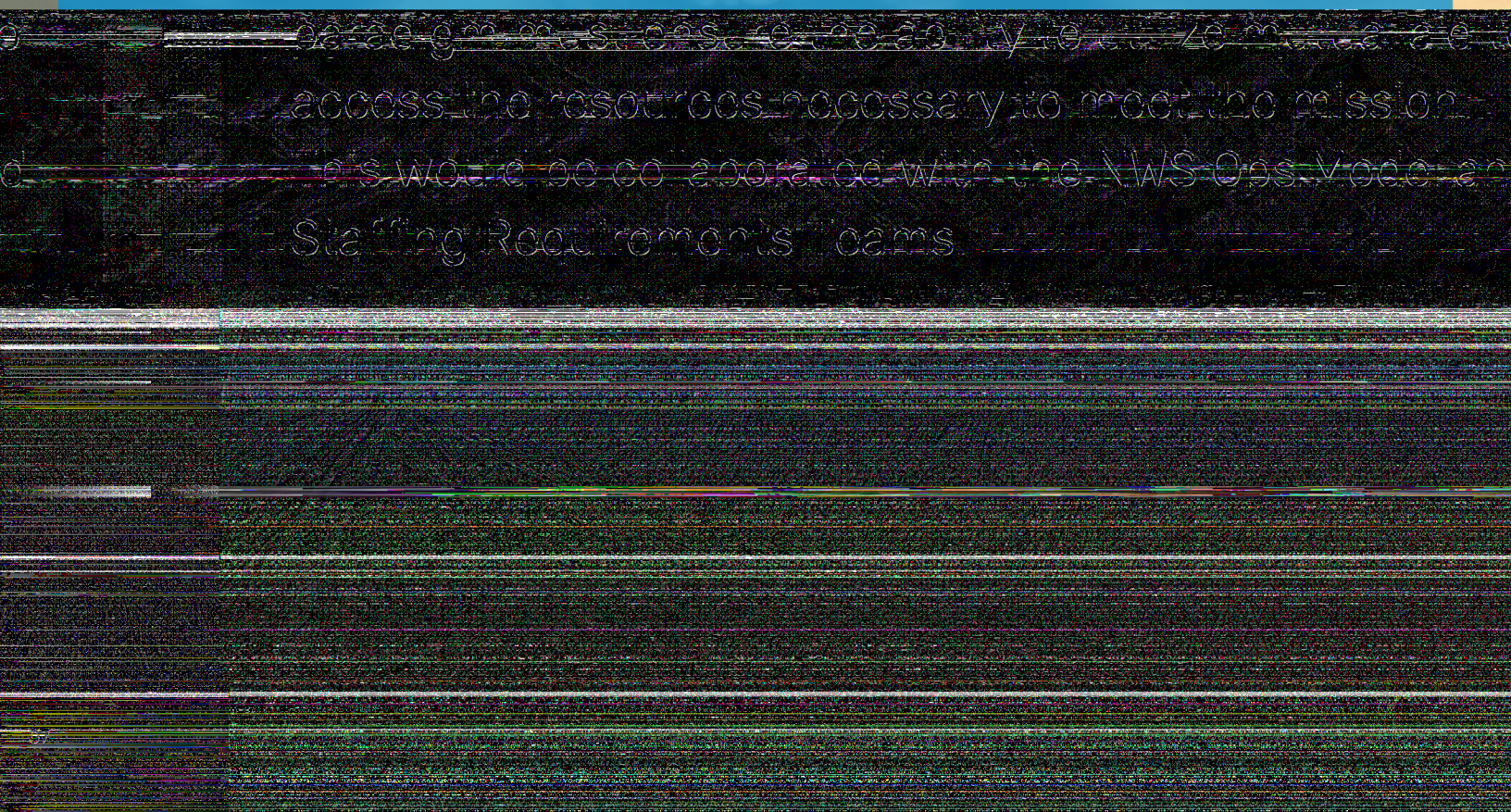
Produce **comprehensive risk-based information** (coupled weather / water / climate and SBES data).

Produce a **trusted analysis of record** for verification and calibration of our probabilistic data.

GOAL 2

Create an Adaptable Probabilistic IDSS Operations Paradigm

Clearly define the future operating roles, responsibilities, forecast process, and workflows of the workforce through an iterative and inclusive process. This new



Establish a **comprehensive probabilistic IDSS operational paradigm** including roles and responsibilities of the workforce to prioritize decision-making rather than database production.

Leverage test beds and proving grounds to test and demonstrate new techniques and methods that allow our workforce explicit **opportunities to influence the future operational paradigm.**

Address culture change through constant communication and demonstrable successes.

goal 2

KEY OBJECTIVES


Provide a Data Integration
Service to Analyze,
Interpret, and Deliver
Proposal Info to DSS
Provide access to services to
identify and interpret meteorological
events and their potential impacts
on mission operations
communicate these information gaps
and acknowledge uncertainty's
seamlessly across programs and mc
are scalable to decision makers
GOAL 3

KEY OBJECTIVES

Develop and operationalize **data visualization interrogation tools** (e.g. DESI and WSUP), leveraging the latest technological and scientific advancements, including Artificial Intelligence where appropriate.

Fully realize an **integrated IDSS Management System** that is accessible from any location to support remote staff and mutual aid.

Utilize SBES research to inform new and improved **probabilistic products and communication methodologies.**

Design **web services** to access our data and allow for partner-customized data visualization and interrogation.

GOAL 4

Strengthen Relationships to Improve Service Delivery

Develop organizational and technical capacity that empowers our scientists to cultivate strong relationships with our Core Partners, so we know what accessors our partners are making, our important resources are, and the sensitivities

goal 4

KEY

Implement a consistent approach (using SBES-endorsed best practices) to **gather feedback from partners to better understand their needs.**

Develop an educational outreach framework for probabilistic information consisting of a standard "toolkit" for partner education, cost-loss training, and developing a culture of partner-centric After Action Reviews, etc.

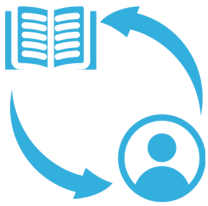
Operationalize an IDSS Management System for collecting partner profiles as part of the IDSS Operations Cycle and to ensure prioritization of vulnerable communities and support partner engagement.

Implement a New, Continuous Experiential Learning Framework

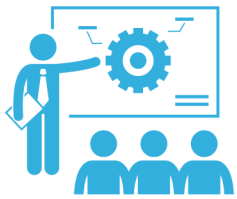
Ensure the NWS operational workforce develop expertise in analyzing, understanding, and communicating uncertainty/probabilistic information.

goal 5

KEY OBJECTIVES



Incorporate **continuous, experiential learning requirements** into the Probabilistic IDSS operational framework with **dedicated staff time and dedicated supportive resources.**



Provide NWS scientists with **an experiential learning environment that integrates Core Partners** and uses tools and data sets mirroring operations to the maximum extent possible.

Make training available to the full NWS workforce on **understanding, utilizing, and communicating** uncertainty and probabilistic information

Realign and expand training resources to support iterative experiential learning for the workforce.

Create a new mechanism to prioritize training requirements and resources across portfolios.

Measuring Success and Continuous Service Improvement

GOAL 4

Use weather, water, climate, and SBES data to assess both the quality and value of [illegible] decisions to ensure we are meeting our mission.

Implement a **robust, reliable feedback loop** among modelers, developers, data providers, operational staff, and stakeholders.

Apply **probabilistic verification methods** to our foundational

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Evaluate performance and
DSS value to ensure results
are incorporated into service
improvements.

Establish SBIS-endorsed metrics for
measuring the quality of user decision-
making to mature next-generation data
measures.

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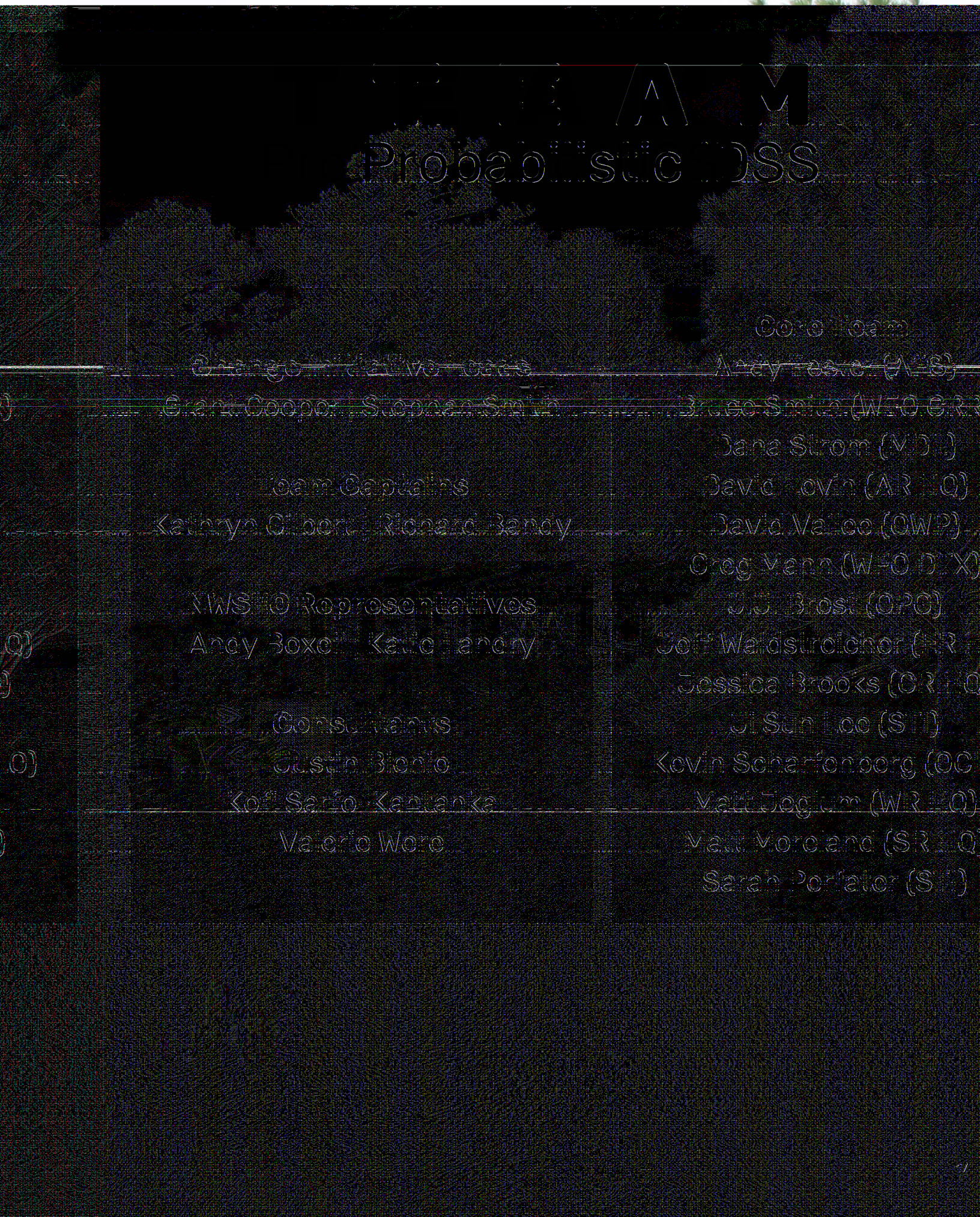
w operational

Ensure dedicated
workforce to cond
evaluation in the ne
paradigm

goal 6

OTHER KEY GOALS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