

5.3 Constructing NOAA's Value Tree: Representing Relationships between NOAA's Organization, Services, and Observing Systems

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- NOAA's Value Tree required representation of critical elements supporting achievement of overall Mission Goals/Mission Service Areas
 - Leadership and SME support was critical to developing the value tree and in addressing value, performance and impact within the tree construct
- This presentation provides a summary of the general process in constructing the value tree with focus on its major elements as well as key elements of analysis leveraging the tree structure (grouping and prioritizing)



General Value Process

- Build a value tree for NOAA's Mission by resolving and relating:
 - NOAA's Mission Goals (e.g., Weather Ready Nation)
 - Mission Service Areas (MSAs) in each Goal (e.g., Severe Weather)
 - Key Product and Service (KPS) Areas within each MSA
 - Key Surveyed Products (the individual products at the NOAA sites that populate the KPS)
- Iterate with NOAA Mission Goal and Line Office leadership to group and weight KPS and Key Surveyed Products
 - Assign Key Surveyed Products to each KPS
 - Assign importance weights to the KPS in each MSA
 - Assign importance weights to the Key Surveyed Product in each KPS

Schematic of the Value Tree Elements

Elements of the Value Tree*



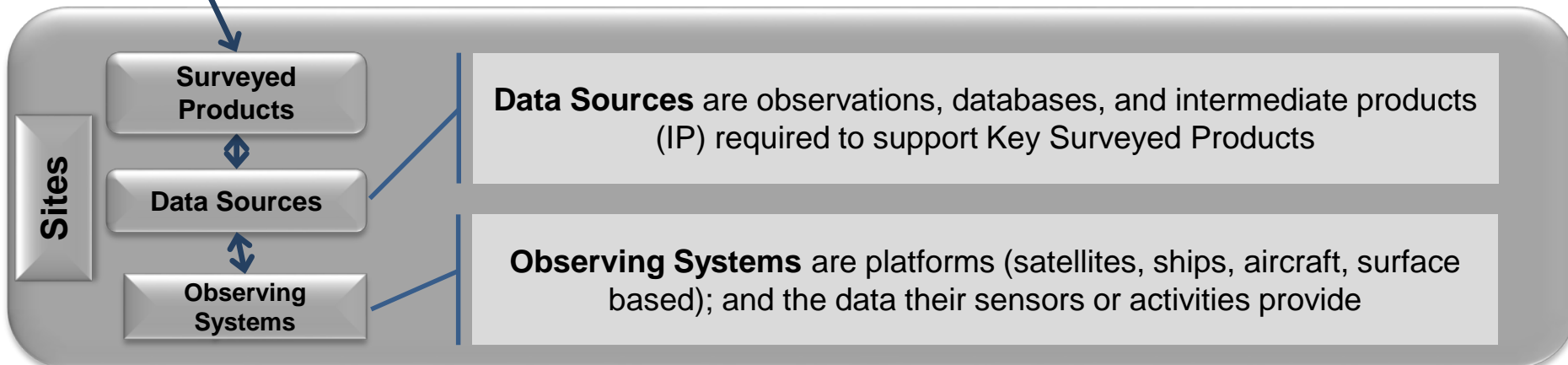
NOAA's Next Generation Strategic Plan (NGSP) defines the top of the Value Tree

Mission Service Areas (MSA) provide a breakdown of the Goals into topical/application areas (similar to NGSP Objectives) that encompass the major functions

Key Products and Services (KPS) represent high visibility (public facing) outcome-oriented groups of products and services associated with an MSA, including science objectives

Key Surveyed Products are the lowest level of the value tree with weights assigned; these link to **Surveyed Products** at the Sites

***This is a simplified view; follow-on presentation describes additional elements**



Data Sources are observations, databases, and intermediate products (IP) required to support Key Surveyed Products

Observing Systems are platforms (satellites, ships, aircraft, surface based); and the data their sensors or activities provide

NOAA Goals & Mission Service Areas (25)

WEATHER READY NATION

1. Aviation Weather and Volcanic Ash
2. Fire Weather
3. Hydrology and Water Resources
4. Marine Weather and Coastal Events
5. Hurricane/Tropical Storms
6. Routine Weather
7. Severe Weather
8. Space Weather
9. Tsunami
10. Science, Services, and Stewardship
11. Winter Weather

HEALTHY OCEANS

1. Ecosystem Monitoring, Assessment and Forecast
2. Fisheries Monitoring, Assessment and Forecast
3. Habitat Monitoring and Assessment
4. Protected Species Monitoring
5. Science, Services, and Stewardship

RESILIENT COASTS

1. Coastal Water Quality
2. Marine Transportation
3. Planning and Management
4. Resilience to Coastal hazards and Climate Change
5. Science, Services and Stewardship

CLIMATE

1. Assessments of Climate Changes and Its Impacts
2. Climate Mitigation and Adaptation Strategies
3. Climate Prediction and Projections
4. Climate Science and Improved Understanding

NOAA is much more than weather and climate: it has a broad array of mission areas that manage fisheries, protect species, manage sanctuaries and monuments; and provide critical services in geodesy, charting, marine transportation and coastal management

Elements of Value-Tree based Analysis

- **Pedigree:** Historical roots in the work of Ralph Keeney and others

Keeney: Value-Focused Thinking: A Path to Creative Decision-making (1992)

- **Methodology/Tool:** The MITRE Portfolio Analysis Machine or PALMA™ methodology and tool was developed and has been used for other Government agencies including NOAA to support this type of analysis

- **“Value”** (as defined in the NOAA model): the overall Performance Score for NOAA in terms of the performance of the constituent mission goals.

- Mission goals and areas defined by NOAA Leadership

- Performance is internally focused (does not explicitly reflect quantitative economic or societal *impacts*)

- **“Impact”** (as defined in the NOAA model): changes to the performance score of a node in the value tree resulting from including or excluding one or more investment options (observing systems)

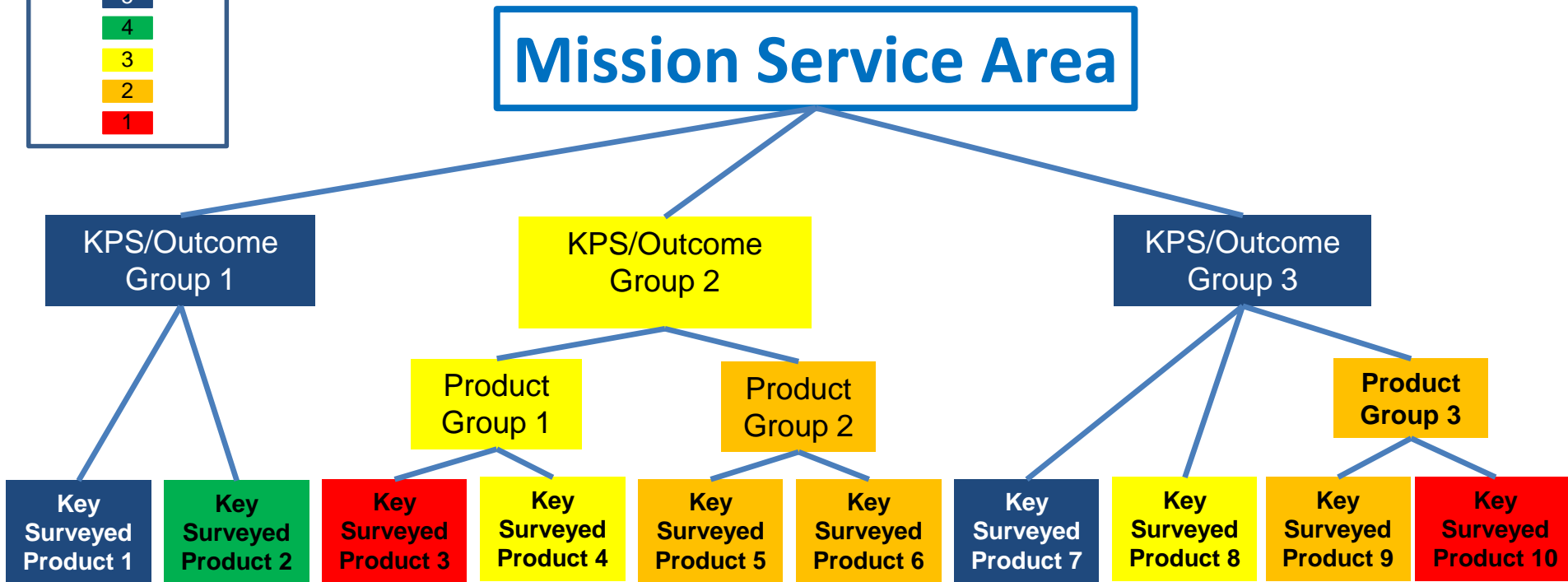
- The Performance Scale is shown to the right and was used throughout the NOSIA II effort, and for the National Earth Observation Assessments in 2012 and (upcoming) 2016

Performance (Satisfaction) Scale		
100	Ideal	Meets all requirements and exceeds some
90	Fully Satisfied	Meets all requirements
80	Good	Meets all major requirements, with minor limitations
60	Fair	Meets most major requirements, with significant limitations
40	Poor	Fails to meet many major requirements, but provides some value
20	Very Poor	Fails to meet most major requirements, but provides minor value
1	No Capability	Provides essentially no value

Grouping and Prioritizing Value Tree Components

- Surveyed Products only have an impact on NOAA if they connect to a Key Surveyed Product
 - Mission Goals are equally weighted and Mission Service Areas equally weighted within each Mission Goal
- Key Surveyed Products are grouped into appropriate Key Product and Service (KPS) nodes based on iterative inputs from NOAA leadership
- NOAA leadership then assigned importance weights on 1-5 scale
 - KPS were assigned importance weights within each MSA by MSA leads
 - Key Surveyed Products were assigned importance weights within each KPS
- Resulting weighting schemes were reviewed by leadership and the groups and weights adjusted to address anomalies
- Resulting observing system impacts and ranks reviewed and approved by leadership (described in more detail in following presentation)

Notional Example of Grouping and Prioritizing Elements of the Value Tree



Explanation: Below the MSA level are KPS/Outcome groups; followed in some cases by groups of products, and then the Key Surveyed Products. Goal Leadership could apply priorities at the KPS/outcome groups, product groups, and key surveyed products. For example, 'Outcome Group 1' has been designated as having an importance weight of 5. This means it is 5 times more influential in the model than an outcome group with an importance weight of 1.



Conclusion

- NOSIA II contains a ground-breaking effort by NOAA to develop a value-tree encompassing all the observing-dependent components of its diverse mission
- Follow-on presentations will provide more information on how the rest of the NOSIA II model was constructed, its capabilities; and applications