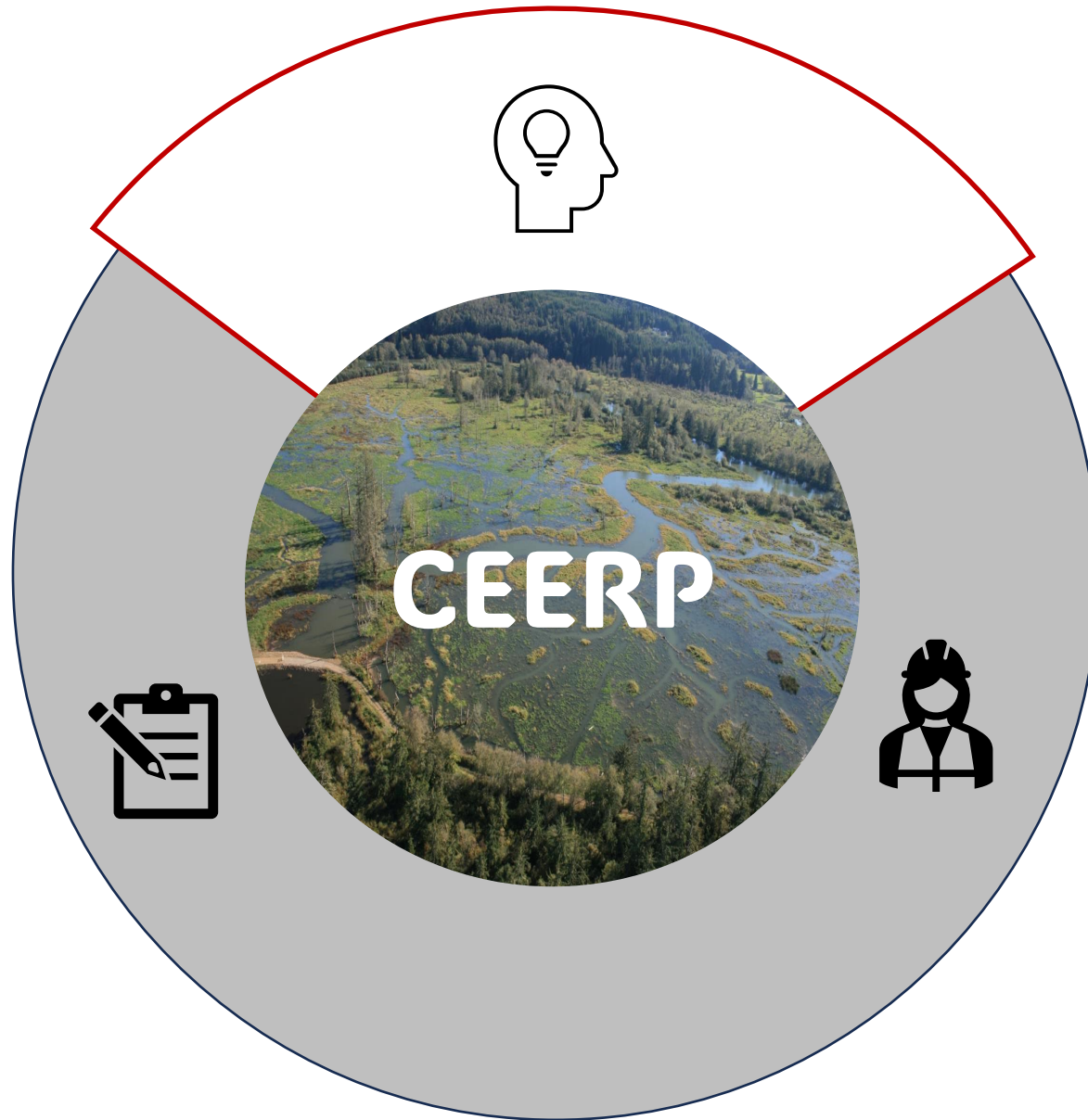**WHAT IS CEERP?**

CEERP

Key Principles:
- Frequently engage partners on Restoration and Monitoring priorities
- Seek lessons learned, especially failures
- Foster collaborative, iterative approaches to complex challenges
- Provide and attend multiple forums to exchange ideas
- Document everything – prioritize primary literature publications, capture institutional knowledge, increase regional visibility

WHAT IS CEERP?

Learning

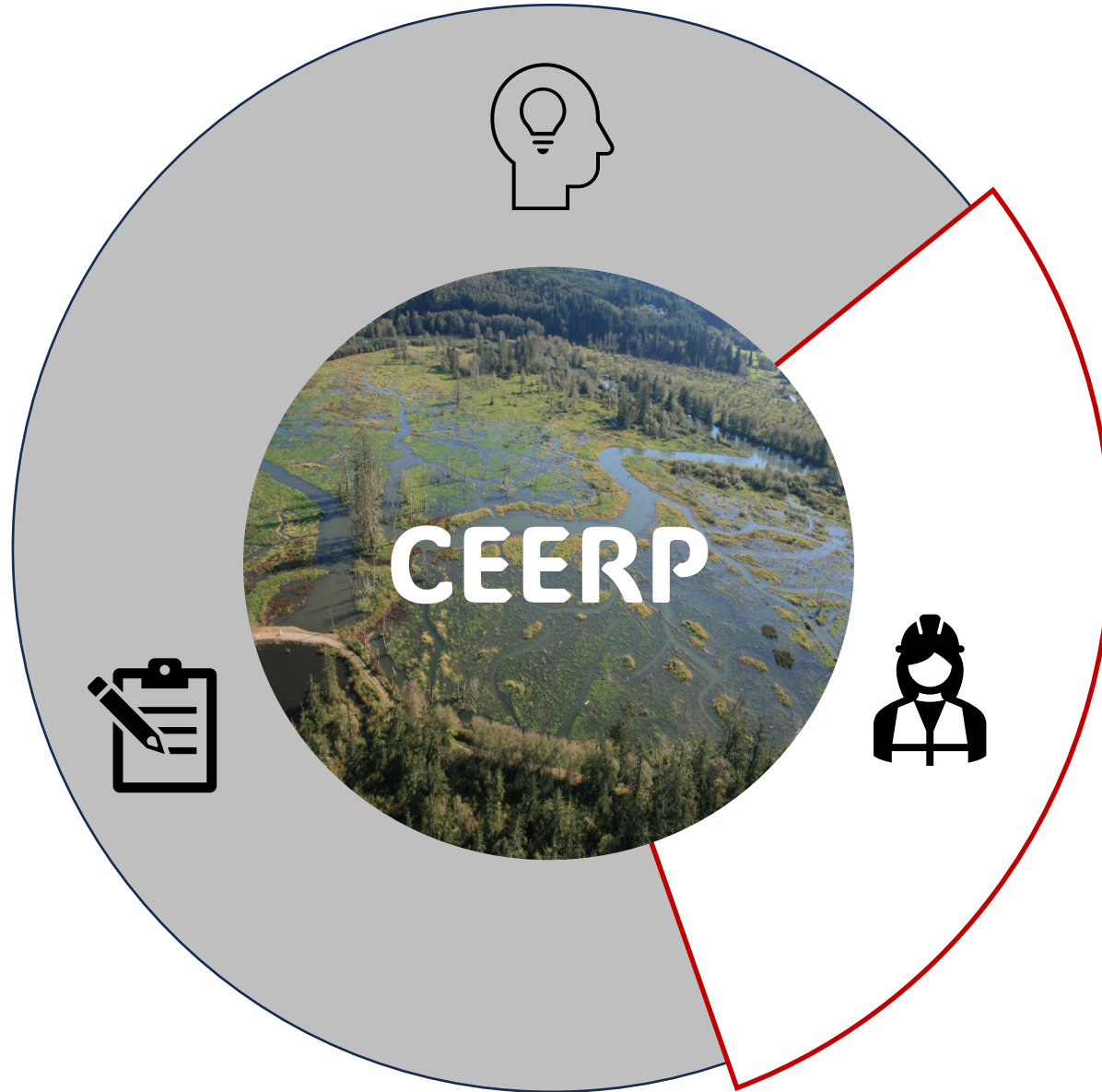- Science Seminars
- **Synthesis Memos**
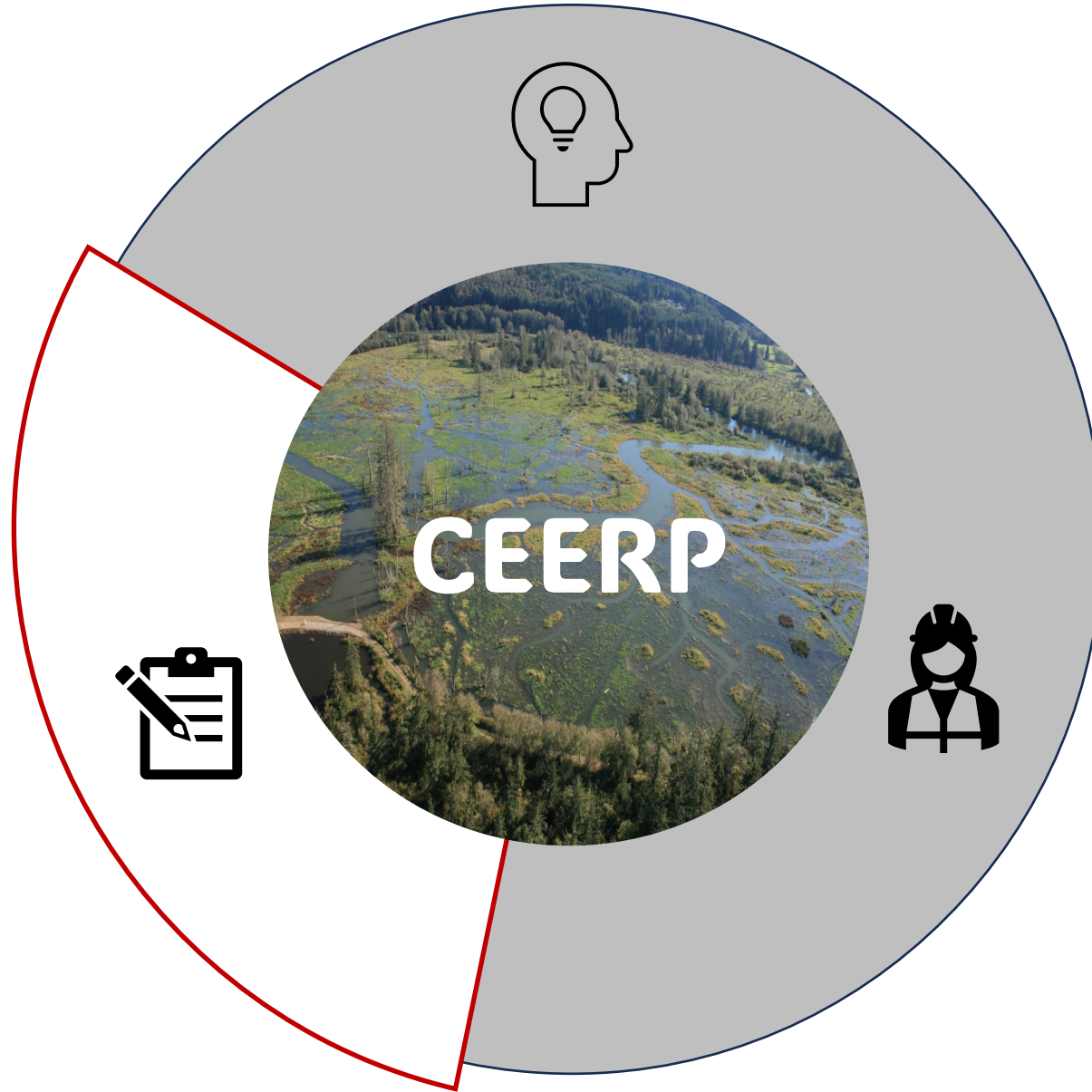- Master Matrix of Learning
- Site Revisits
- CREC and Sponsor Workshop

CEERP

Restoration

- Landscape Planning Framework
- Implementation Forecaster
- Landscape Principles
- Restoration Design Challenges

WHAT IS CEERP?

CEERP

Monitoring

- Critical Uncertainties Research
- Action Effectiveness Monitoring & Research
- Status and Trends Monitoring
- Compliance Monitoring

BUDM Modeling

- Working to distill feedback from stakeholders – Sept workshop
- Draft causal graphs depicting relationships between functions and indicators
- Identify useful existing data
- Determine data or research needs to address large uncertainties

ERTG Work Products

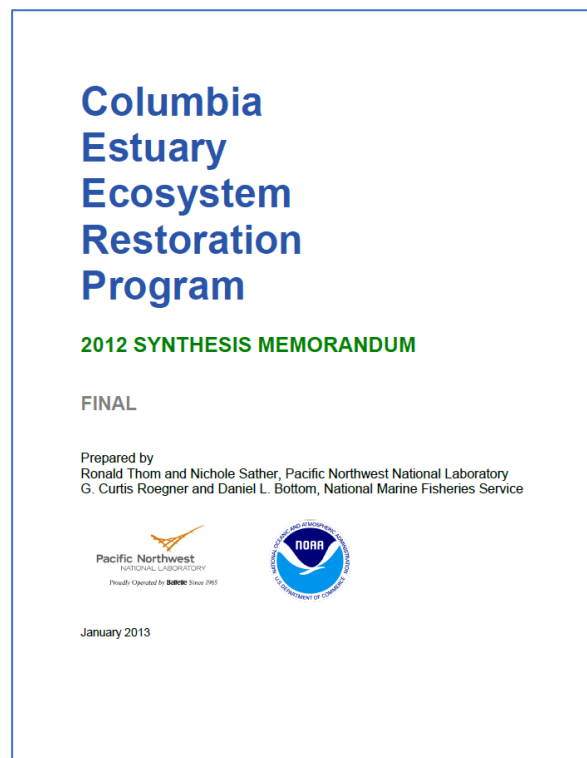- Climate Resiliency

- Conceptual Foundations

CEERP Website

- Going LIVE Summer 2025

Addressing Key Uncertainties

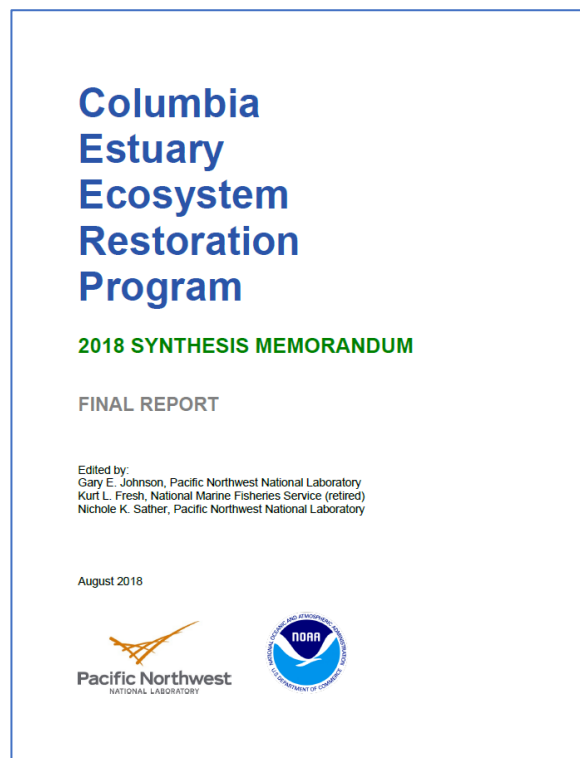- Flux Study
- Tag Study

Synthesis Memorandum #3

Synthesis Memorandum #3

WHAT'S NEXT

SM#1

SM#2

SM#3
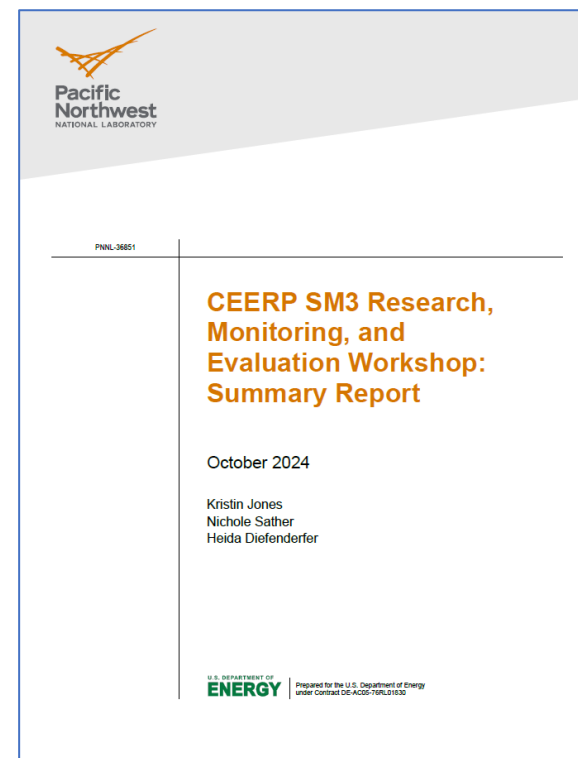
Synthesis Memorandum #3

- Where and when: Portland, OR, June 24-25, 2024
- Format: Highly interactive small-group exercises progressing through each aim to synthesis
- Goal: Collaboratively understand the state of the science around the CRE, identify knowledge gaps, and prioritize future research and monitoring.
- Organizations present (26 Attendees):

  - BPA
  - CREST
  - Coastal Oceans, LLC
  - Columbia Land Trust
  - ERTG
  - LCEP
  - NOAA Fisheries
  - OHSU
  - PNNL
  - U.S. Army Corps of Engineers
  - WDFW

State of the Science

Knowledge Gaps

Research Priorities

Synthesis Memorandum #3

Visions for the Future

Synthesis

Future AEMR
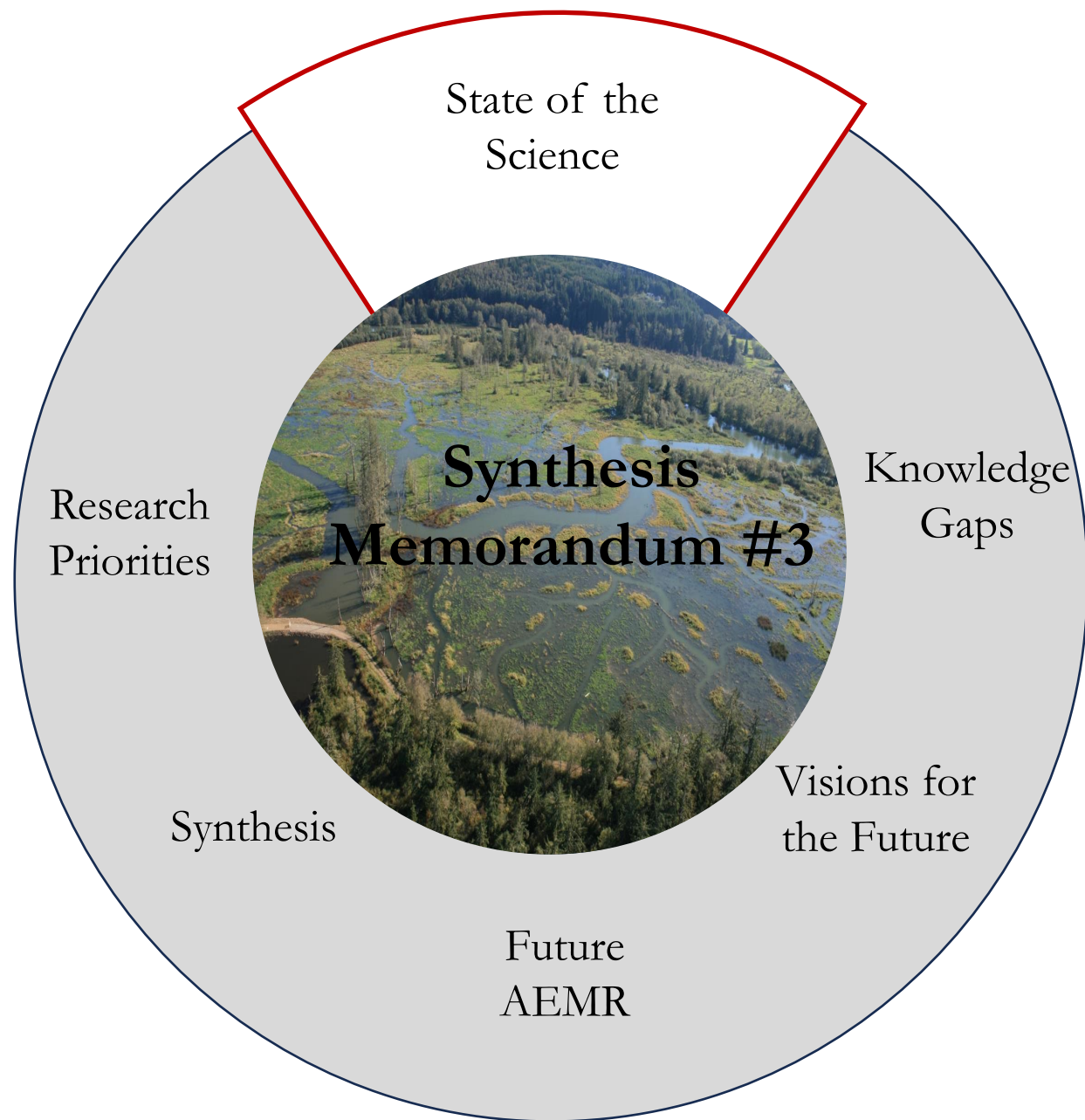
Goal: Build on the status of knowledge on ecosystem science and restoration in the CRE.

- *Examples* of existing knowledge in each domain group:
  - Fish and Food Webs:
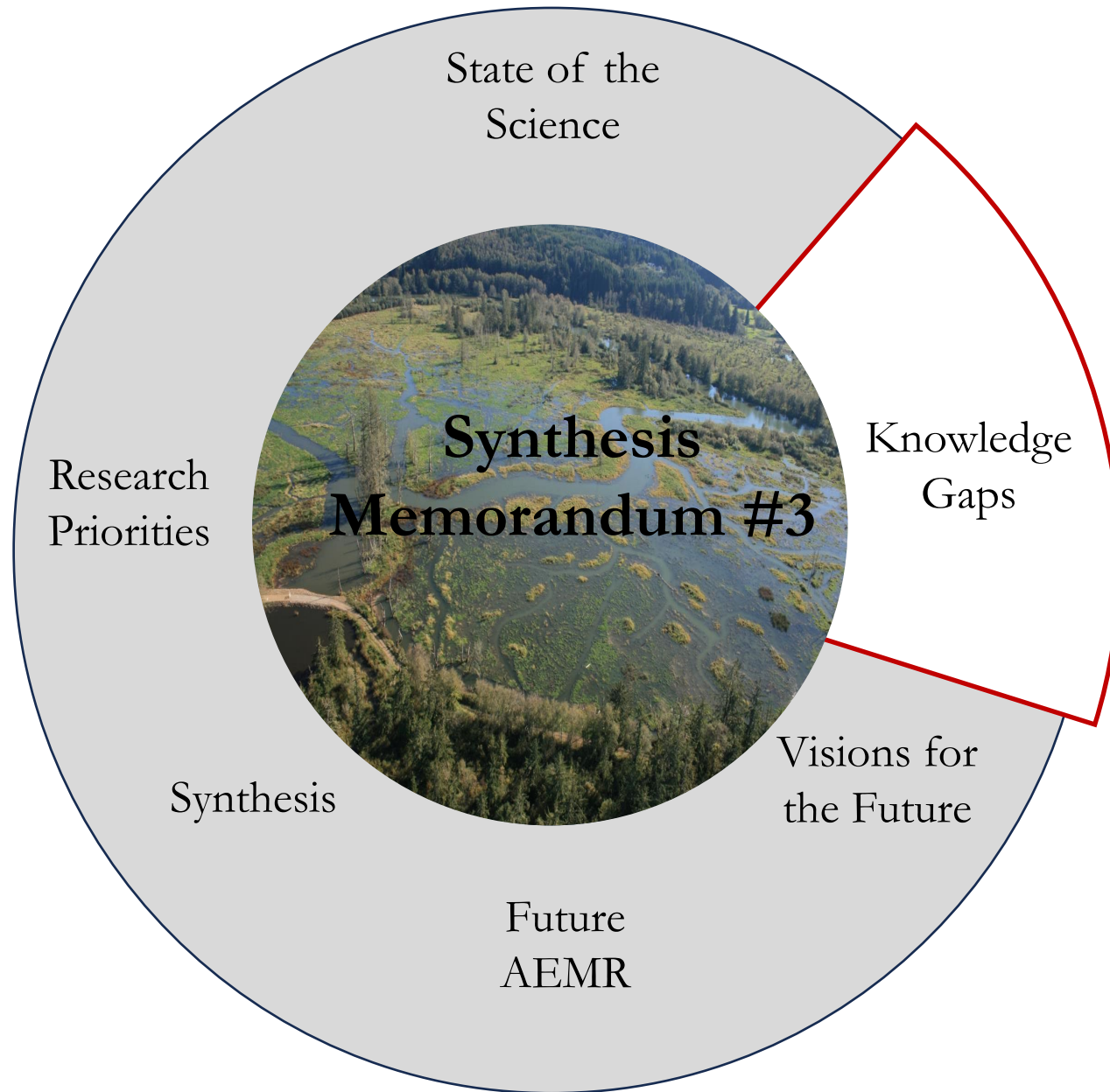   - Fish (of many species) use and benefit from an array of habitats in the estuary. While diet data suggests salmon and steelhead foraging occurs near the water surface, prey resources are tightly coupled with benthic habitats.
  - Physical Processes:
    - Almost all tributaries are significantly cooler than the mainstem, many have better sediment and temperature regimes, and are very dynamic.
  - Programmatic Planning:
    - Regular check-ins between sponsors and restoration practitioners would add value
    - There are opportunities to broaden the focus and impact of the ERTG
  - Wetland Ecosystem Monitoring:
    - Restoration scientists have learned how to control reed canary grass through spraying of herbicide and conversion of mid and high marsh back to native species.

State of the
Science

Knowledge
Gaps

Research
Priorities

**Synthesis
Memorandum #3**
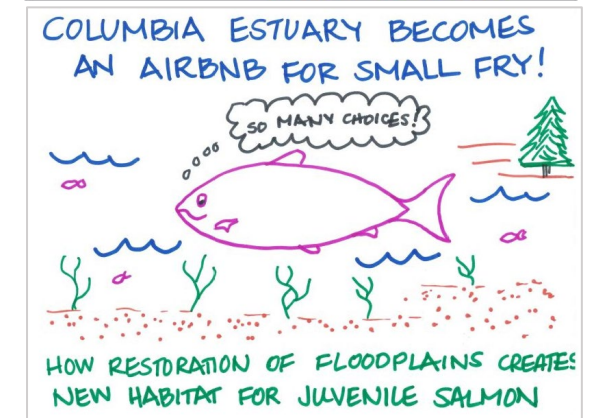
Synthesis

Visions for
the Future

Future
AEMR

Goal: Identify knowledge gaps critical for advancing CEERP program objectives.

- Example questions and knowledge gaps from each domain group include:
- Fish and Food Webs:
  - Is predation random of selected based on certain factors, such as size, condition, etc.?
  - **How do we prepare for climate change and make the habitats successful in the future?**
- Physical Processes:
  - **How much sediment from the mainstem makes it onto the wetlands?**
  - Is dredged material more persistent in shallow or deep water?
- Programmatic Planning:
  - Need for understanding short vs long-term BUDM benefits
  - **How can we make it easier to better support complex restoration projects, and how do we build more support for pilot projects?**
- Wetland Ecosystem Monitoring:
  - Need for understanding changes in wetland productivity and distribution of vegetation and marsh types
  - Need vegetation, organic matter, prey, design features, and temperature data to inform predictive models
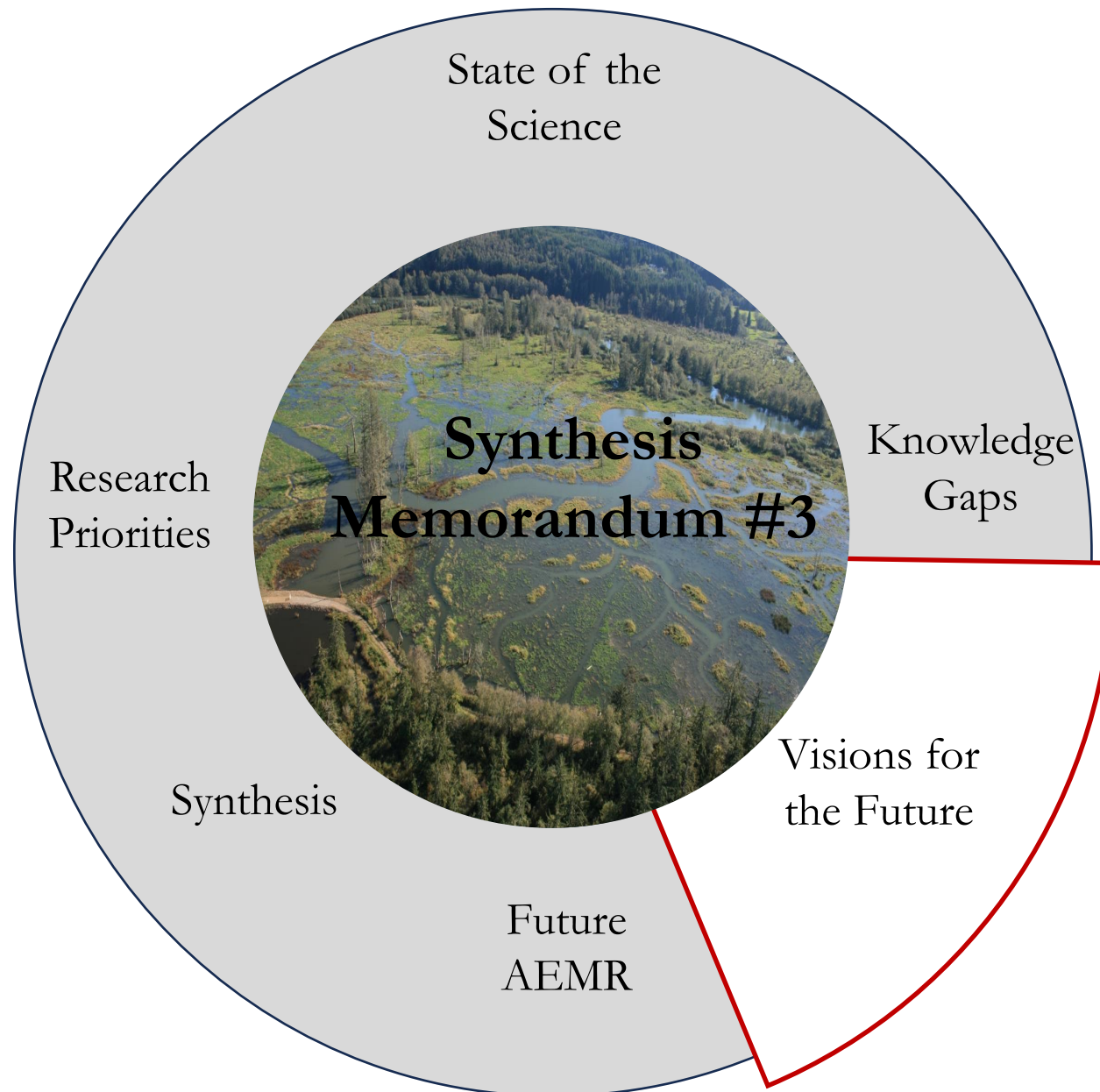
WHAT'S NEXT

State of the Science

Research Priorities

Synthesis

Knowledge Gaps

Visions for the Future

Synthesis Memorandum #3

Future AEMR
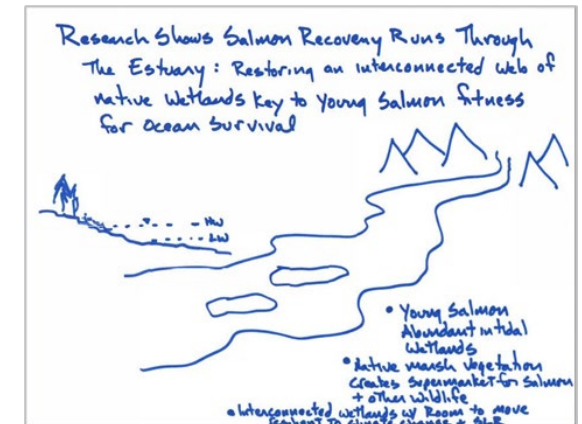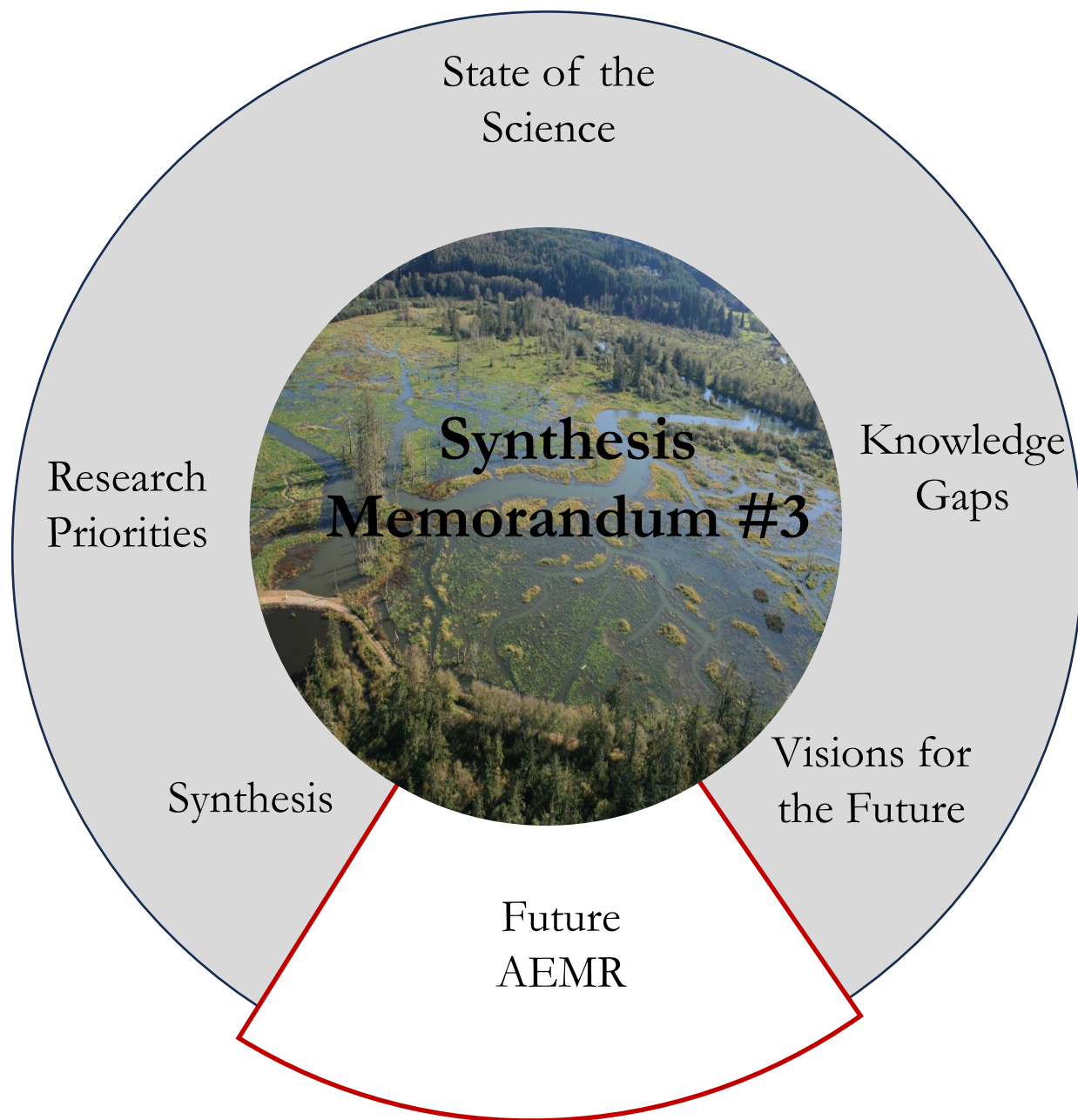
Goal: To evaluate the level of knowledge and impact associated with monitored indicators.

- Takeaways:
  - Participants found the indicators we know the least about seemed to be the most important.

  - Specific research questions will help to inform importance of indicators.

  - Indicators generally high on knowledge and importance were latitude/longitude, temperature, salinity, and WSE.

  - **Fish indicators (growth, condition, survival, stock) were generally placed in high importance but low knowledge.**

WHAT'S NEXT

State of the Science

Knowledge Gaps

Synthesis Memorandum #3

Research Priorities

Synthesis

Future AEMR

Visions for the Future
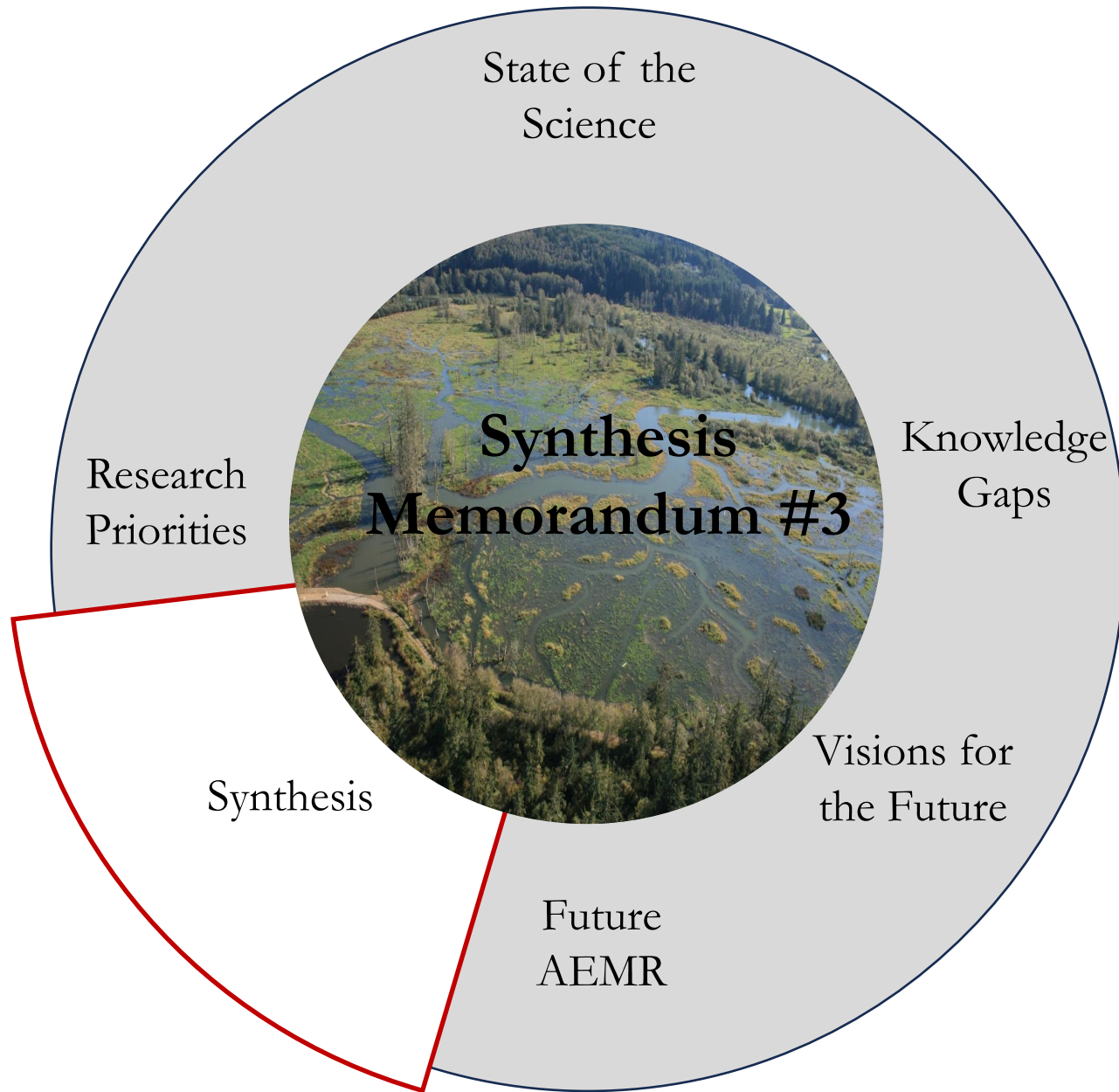
Goal: Gather participant conclusions on key findings and relevance to CEERP based on professional experience and workshop participation.

- While this was an individual exercise, it was followed by sharing and discussion and some common themes were found within domain groups in their synthesis activities

WHAT'S NEXT

State of the Science

Knowledge Gaps

Visions for the Future

Future AEMR

Synthesis

Research Priorities

Synthesis Memorandum #3
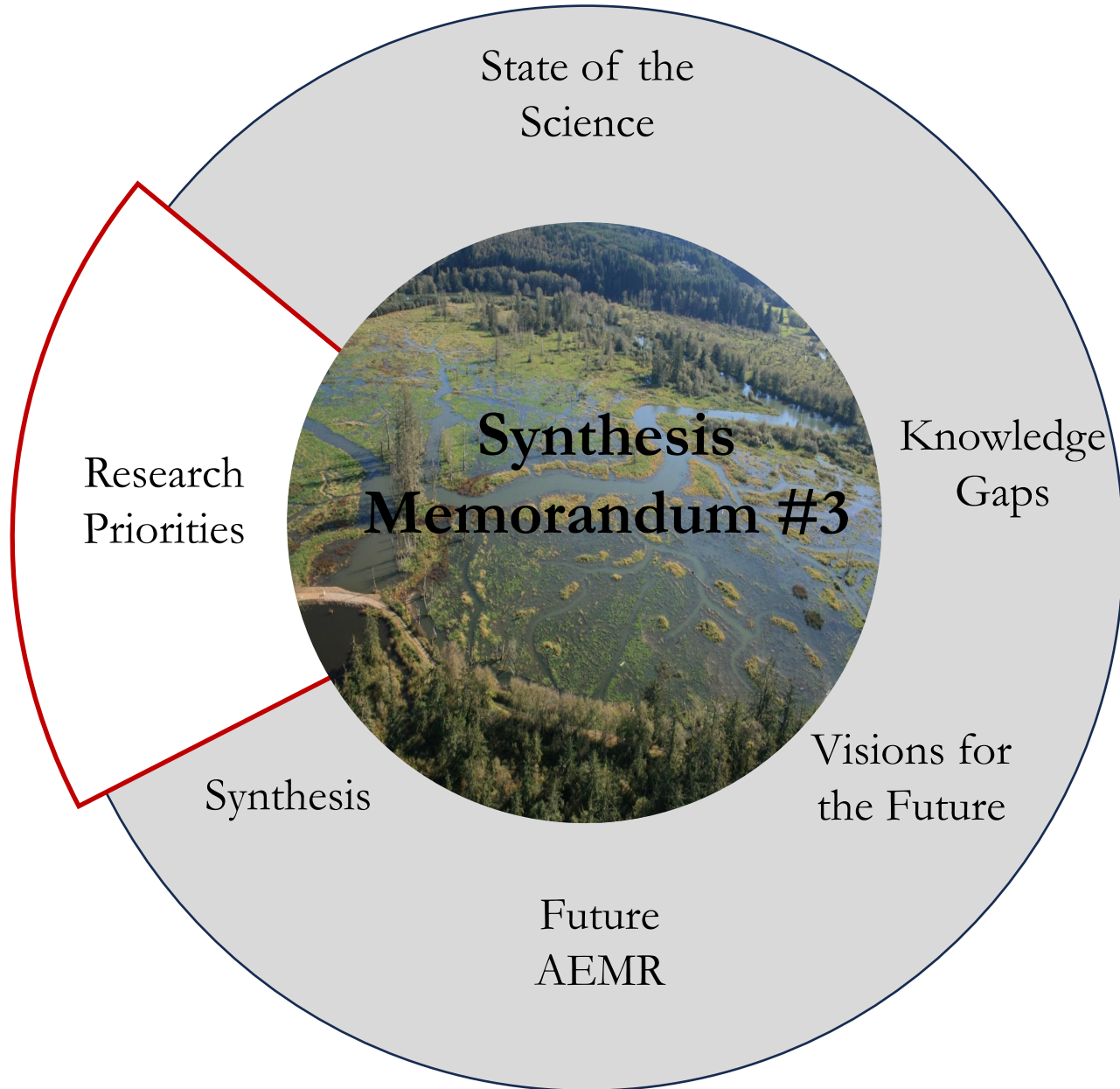
Goal: Identify and prioritize research questions to advance CEERP decision making.

- Research questions were prioritized by ranking them in order from the most to the least votes from workshop participants, and then discussed, with participants reaching a general consensus.
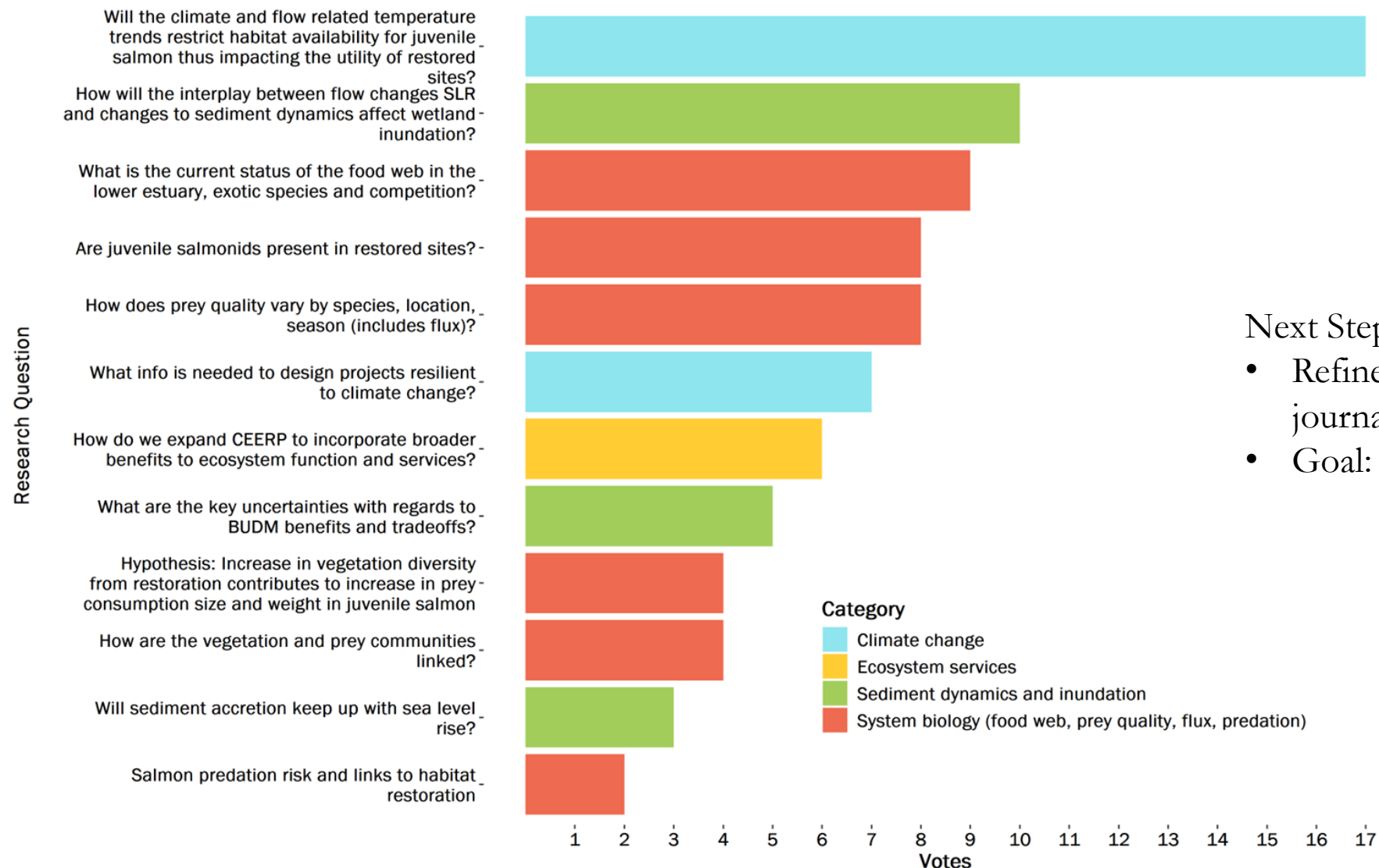
Synthesis Memorandum #3

Research Priorities

WHAT'S NEXT

Research Question (y-axis)

- Will the climate and flow related temperature trends restrict habitat availability for juvenile salmon thus impacting the utility of restored sites?
- How will the interplay between flow changes SLR and changes to sediment dynamics affect wetland inundation?
- What is the current status of the food web in the lower estuary, exotic species and competition?
- Are juvenile salmonids present in restored sites?
- How does prey quality vary by species, location, season (includes flux)?
- What info is needed to design projects resilient to climate change?
- How do we expand CEERP to incorporate broader benefits to ecosystem function and services?
- What are the key uncertainties with regards to BUDM benefits and tradeoffs?
- Hypothesis: Increase in vegetation diversity from restoration contributes to increase in prey consumption size and weight in juvenile salmon
- How are the vegetation and prey communities linked?
- Will sediment accretion keep up with sea level rise?
- Salmon predation risk and links to habitat restoration

Votes (x-axis: 1–17)

Category
- Climate change
- Ecosystem services
- Sediment dynamics and inundation
- System biology (food web, prey quality, flux, predation)

Next Steps:
- Refine details of journal article.
- Goal: publish in 2025