Decision Management Plans and Risk Registers

Tools to Understand and Communicate Risk & Uncertainty

Brian Harper, USACE-IWR

Scott Nicholson, USACE-HQ

Kendall Zaborowski, USACE – LRC/LRL

Jerry Fuentes, USACE – SPK

2015 National Planning Community of Practice Training

2 June 2015

US Army Corps of Engineers

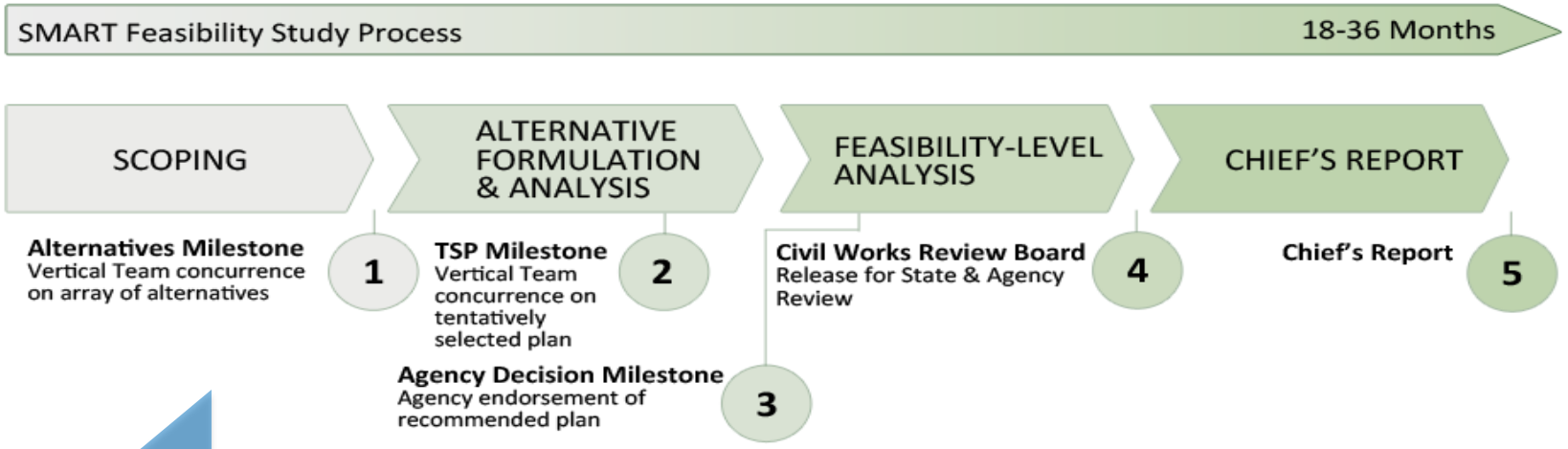
PLANNING SMART

BUILDING STRONG®

SMART Planning Principles

- **Manage and balance an appropriate level of detail and acknowledge uncertainty**
- **Ensure that vertical integration and engagement of decision makers takes place early and throughout the planning process**
- **Recognize there is no single "best" plan and there are quantitative and qualitative methods of alternative comparison and selection**
- **Identify Federal Interest in resolving a problem up front**

Study Process & Milestones



Focus on alternatives evaluation to identify a tentative plan for more detailed design

Focus on scaling the measures and features for the recommended plan/LPP

Managing Uncertainty and Planning Risks

Decision Management Plan

Risk Register

Decision Information

- **What is the next planning decision?**
- **What information will you use?**
- **How will that info be developed?**
- **Make the decision as soon as you have enough information.**

Consequences

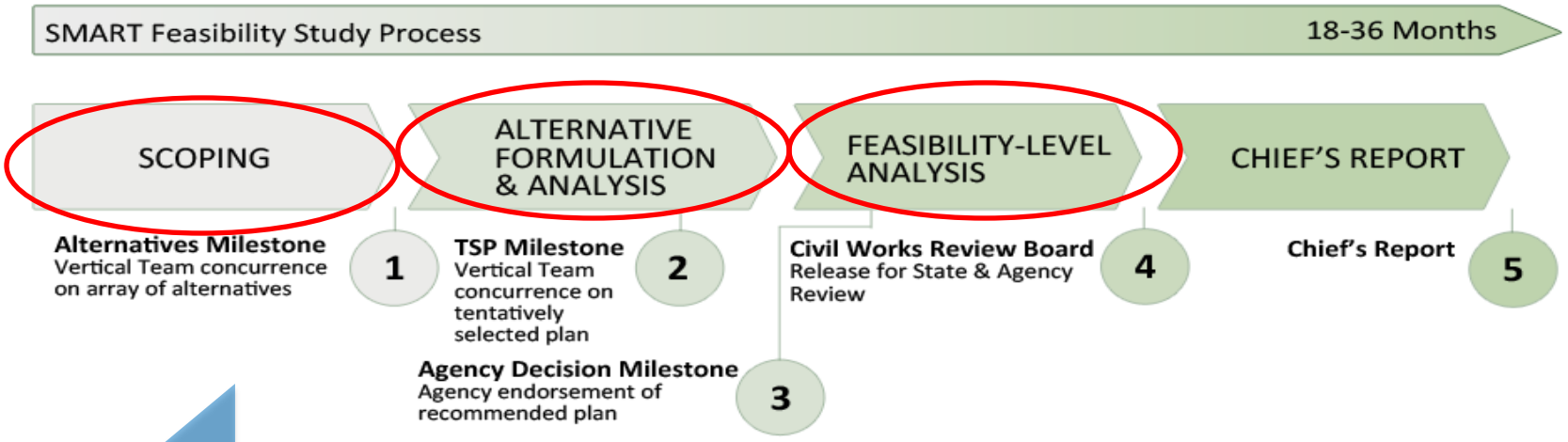
- **What are the key uncertainties?** **(in methods, tools, data sources, etc)**
- **What happens if you make a poor decision?**
  - Planning study impacts
  - Project implementation impacts
  - Project outcomes
- **Use scope of work to manage your risks**

DMP Outline

- What is the planning decision to be made?
- What criteria will you use to make it?
- What is the sequence of events required to make it?
- Who will develop that information and when?
- Who will make the decision and how?
- When will the decision be made?

Be Specific

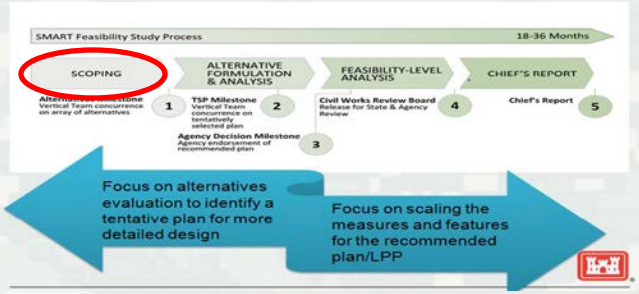
Common DMPs



Focus on alternatives evaluation to identify a tentative plan for more detailed design

Focus on scaling the measures and features for the recommended plan/LPP

Alternatives Milestone DMP



Decision(s)

- Define Federal Interest
- Array of "significantly differentiated" plans

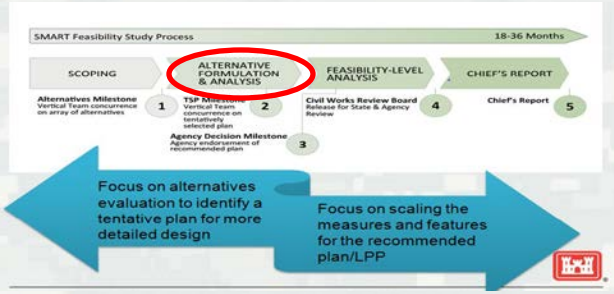
Use Info to:

- Establish Existing and FWOP Conditions
- Do initial formulation and screening

Common Challenges:

- Simplified analysis or modeling?
- Is climate change a factor?
- Maximize use of available knowledge

TSP Milestone DMP



Decision(s)

- Identify TSP (and perhaps LPP)

Use Info to:

- Objectively screen, compare, reformulate
- Identify trade-offs between plans

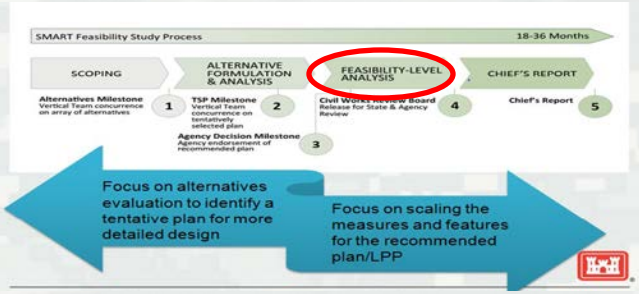
Common Challenges:

- Level of detail to distinguish one plan from the others
- Certified models vs. "approval for use"
- Standard procedures vs. non-standard
- Maximize use of available knowledge

CWRB Milestone DMP

Decision(s)

- Confirm TSP



Use Info to:

- Report costs, benefits, impacts, risks

Common Challenges:

- Confidence in benefit and cost estimates
- Develop mitigation plan
- Characterize performance and communicate residual risks
- Inform risk management plan for PED, construction, operating life

The Risk Register

- **Identify the risk issues in the DMP strategy**
- **Assess the likelihood and consequence of the risks**
- **Characterize the uncertainty in this risk assessment**
- **Identify the risk management options for high risk items (include budget and schedule effect)**
- **Recommend and implement actions/tasks in support of the DMP**

Be Specific

Risk in Planning Studies

Risk = *f(*Probability, Consequence)

- **Study risk**
  - Analytical error, Study delays, Study cost increase, Make a poor planning decision
- **Implementation risk**
  - Schedule and Cost
- **Outcomes**
  - Hazard Risks (identified in study)
  - Also, risks associated with project performance

Uses of Risk Register

PDT

- Identifies study and project risks
- Assess impact of decision making under uncertainty
- Objective risk evaluation (don't vent in the RR)
- Identifies risk management strategy for high risk items
  - Scope, schedule, budget
- Communicates risks to others
- Use RR in life-cycle project risk management

Vertical Team

- Participate in development
- Review for understanding (not for right/wrong)
- Discuss risk ratings, evidence
- Concurs with or suggests alternate risk management strategy
- Monitors high risk outcomes
- Evaluates results
- Use RR in life-cycle project risk management

Using the DMP and RR in a Feasibility Study

- **Complete a series of DMPs**
  - 5-10 pages, concise, complete, plain English
  - One for each major decision
- **Use RR to document and manage risk over the course of the study (and beyond)**
- **Submit vertically aligned recommendations**
- **They should speed things up and save money (minimizing re-work through advance discussion and agreement)**

Ownership

The DMP and Risk Register belong to the entire vertical team, not just the study team.

RISK REGISTER EXAMPLES

Task	Risk and its cause	Consequence	Consequence rating	Evidence for consequence rating
This is the task, decision, problem, question, issue, event, hazard or opportunity that is to be managed	*Briefly identify the risk. Considering the entry in column C, what can go wrong and how can it happen?*	*Describe the consequence of the column D risk. If things do "go wrong" in the way described what is the specific consequence for the study or project outcomes? (List the most significant consequence first if more than one.)*	*If the most significant consequence in column E occurs what is its potential magnitude?*	*Enter specific evidence used to support the consequence rating in column F.*
Avian IBI Modeling	Model has not specifically been used as it is being applied for the WSC study.	Results of modeling may not exhibit significant differences between WSC and reference reaches.	High	The incremental cost analysis is dependent on our abilitiy to quantify differences in restoration measures resulting in changes to the avian community. If the model does not have the ability to quantify significant differences, we lose the ability to quantify the incremental benefits.

Likelihood rating	Evidence for likelihood rating	Risk Rating	Risk Management Options	Recommendation
What is the likelihood that the most significant consequence in column E will occur?	*Enter specific evidence used to support the likelihood rating in column H.*	*Qualitative risk rating from lookup table.*	*Enter options for reducing the risk.*	*Identify any preferred course for managing the risk. Tolerate the risk is the default option.*
Low	My best professional judgement of the existing habitat conditions is that the WSC are missing the vertical habitat layers required of many migratory, resident, and wintering bird species. At a minimum, I anticipate significant differences between canopy nesting, canopy feeding, and non-native bird species populations between WSC and the reference reaches.	Medium	After model development with the spring avian survey data, follow up with a fall bird survey, and modify sampling protocol if necessary.	Conduct fall bird survey.

Observer bias in b ird survey	Using multiple teams with differing members may introduce bias in data collection for the avian surveys	Increased variability in raw data resulting from observer bias may decrease the ablility to detect significant differences in parameters used in the Avian IBI modeliing process.	M

High	Randomize observer assignments between sampling locations and data recorder staff. Utilize the same observers and data recorders for each sampling session.	Cycle each observer through each creek or reference reach during the course of the sampling season so that each observer samples each creek with the same effort. Rotate data collection personnel with avian observers. Utilize the same observers and recorders when possible.

Capturing avian use of WSC and reference reaches	Birds are identified by sight and sound. Many birds are cryptic or relatively quiet, specifically during migration as many neotropical species migrate at night.	May not capture all species utilizing WSC or the reference reaches	M
		Medium	Although it would be ideal to identify all birds in the study area and greater benefits could potentially be realized, the WSC and reference reaches will be compared to each other. The probability of missing a species is assumed to be the same across both the reference reaches and the WSCs