

MISSOURI RIVER

R E C O V E R Y P R O G R A M

Adaptive Management in the Recovery Program

Craig Fleming
Integrated Science Program





Purpose of this Presentation

- Introduce AM Strategy
- Define and describe SDM as a tool in AM
- Briefly outline AM in the Recovery Program



Application to MRRP

Phase I

- Apply AM steps and principles to ongoing actions (objectives, actions,...)
- Develop AM decision support tools (models, analyses, info/reports)
- Work with decision makers and stakeholders to develop learning process

Phase II

- MR ERP
- Apply AM principles within process and use defined AM strategy to implement final plan



Applying AM to Ongoing Activities

- RPA elements, Mitigation actions
- Initially working to address jeopardy and meeting program goals while improving physical and biological environments
- Use SDM to define problem, objectives, actions, monitoring, analysis, assessment, models
- Work with managers to refine decision making process



Ongoing Activities Continued

- SWH & ESH as pilot projects using Structured Decision Making Rapid prototyping to begin developing framework and tools
- Currently expanding prototypes into Draft ESH and SWH Plans
- Assessing utility of SDM in implementing AM for Phase I



Struggles in Phase I

- Tough getting implementers to embrace the paradigm shift.
- Little to know planning at scale larger than the bend
- Analysis and assessment lagging behind need.
- Decision making process slow in developing.



Involvement

- Product Delivery Teams
- CORE Team
- MRRIC

Stakeholder
Input

Product
Delivery Team
(PDT) Results

CORE Team
Decisions
MRRIC Recom-
mendations



Emergent Sandbar Habitat
Shallow Water Habitat
Spring Rise
Pallid Sturgeon
Piping Plover & Least Tern



Structured Decision Making (SDM)

as a tool to implement AM

"SDM is the formal application of common sense to situations too complicated for the informal application of common sense"

Ralph Keeney, Harvard Business School

- SDM brings focus, purpose and organization to management actions, monitoring and assessment to improve our decision making ability

PrOACT

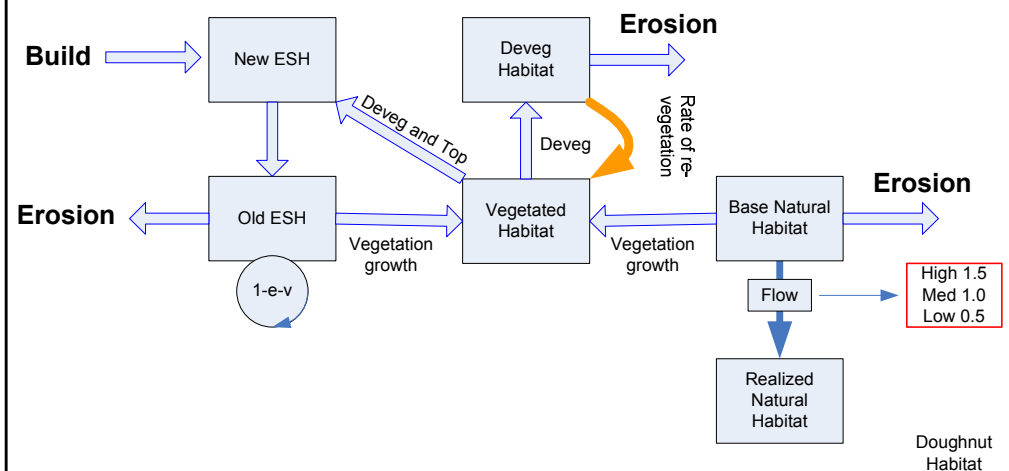
- Problem
- Objectives
- Consequences
- Trade offs



Example

- **Policy**- We can recover species needs implementing RPA's while meeting all authorized purposes
- **Goal** – Recover Piping Plover populations
- **Objectives:**
 - Meet acreage target 2015
 - Meet fledge ratios
 - Increase tern & plover populations
 - Minimize socio-economic impacts
- **Actions:**
 - Create ESH
 - Devegetate and overtop
 - Predator control
- **Evaluation** – (monitor, analyze, assess)
 - Monitor acres, nest density & fledge success; monitor effectiveness Assess progress of program towards goals and objectives
 - Incorporate learning to improve the model & predictions for planning actions at additional sites

- **Model** – Plover populations are limited by lack of nesting habitat (Excel spreadsheet model)
- **Uncertainties** – How much habitat is needed to meet recovery goal? Does created habitat meet population growth needs? How to maintain this habitat?





End Game

- Stop when –
 - Goals/objectives are met
 - Decisions are no longer significantly affected by uncertainties



What's Next

- Further engage with MRRIC
- Continuing to refine AM process and actions on SWH and ESH
- Further models and information utilization
- Begin developing other actions (Spring Pulse, Mitigation, Yellowstone Intake...)



<http://moriverrecovery.org>

info@moriverrecovery.org

U.S. Army Corps of Engineers

Omaha District

1616 Capitol Ave.

Omaha, NE 68102

402-995-2419

Kansas City District

601 E. 12th Street

Kansas City, MO 64106

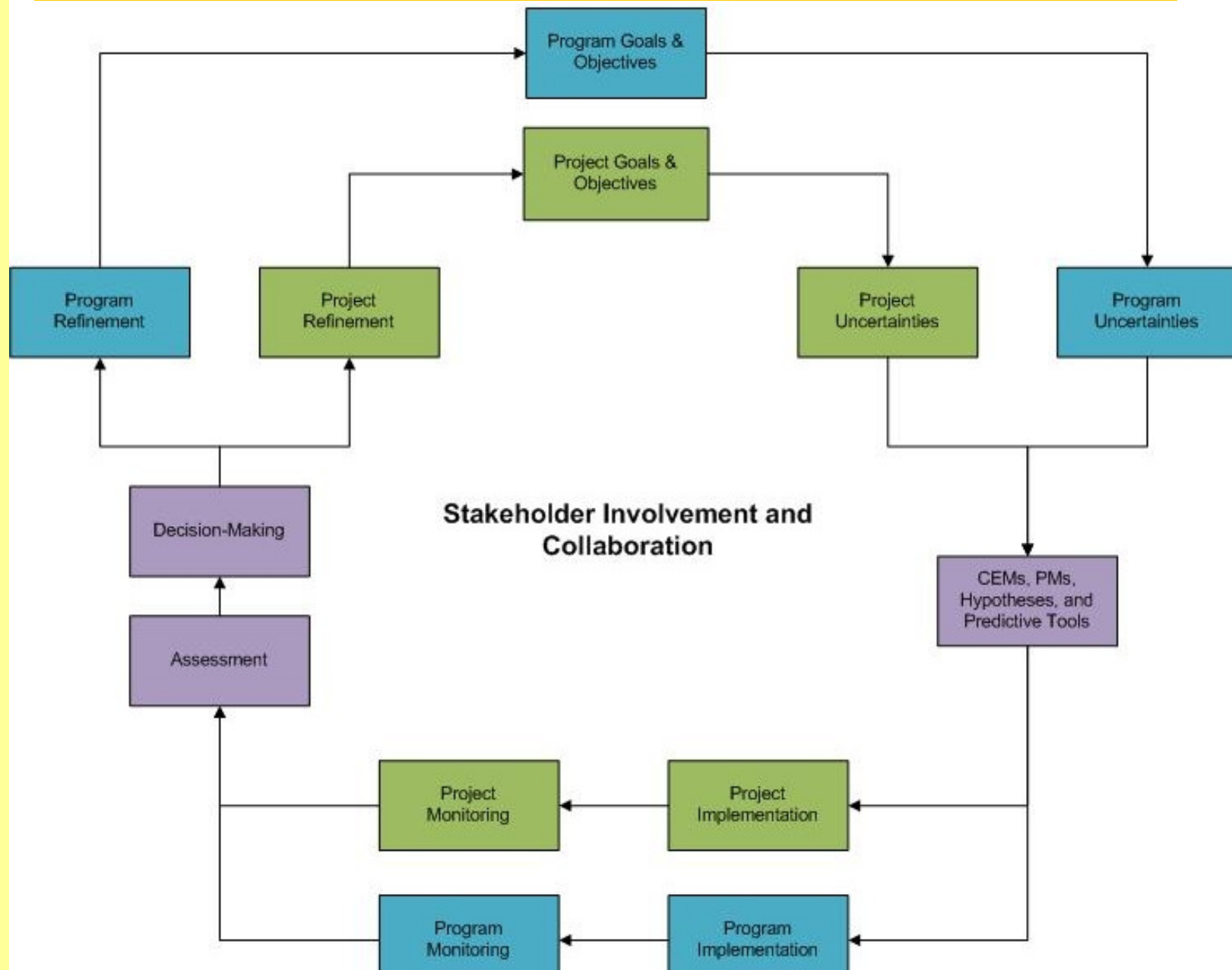
816-389-3688

Craig Fleming

Integrated Science Program

MF 402-667-2880 TWTH 605-384-4152 Next

Adaptive Frame Work





Consequence Table

	Action Scenarios			
Objectives	1	2	3	4
Area ESH in 2015	2900 ac \pm 300	2500 ac \pm 300	2900 ac \pm 600	3100 ac \pm 600
Number of Birds in 2015	500 \pm 200	250 \pm 200	500 \pm 600	150 \pm 50
Fledge Ratio in 2015	1.3 \pm 0.2	1.0 \pm 0.2	1.3 \pm 0.2	2.0 \pm 0.5



Omaha District US Army Corps of Engineers



Management Action	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Mechanical Creation (X)	BTB pp to reach deficit	BTB pp to reach deficit focused on GP moving upstream	BTB pp to reach deficit	BTB pp to reach deficit	0
De-vegetate (Y)	10% available habitat	0	10% available habitat	20% available habitat	50% available habitat
Vegetation Modification (Z)	10% available habitat	0	10% available habitat	10% available habitat	50% available habitat
Predator Control (W)	None	On all created bars	100% on GP reach	In all reaches proportional to need	None
Summer flow (SS or FTT) (U)	FTT	FTT	FTT	FTT	FTT
Unbalancing of Upper 3	NA	NA	NA	?	?

BTB = build to budget; pp = proportional percentage; GP = Gavins Point; SS = steady state; FTT = flow-to-target; NA = not applicable.





Adaptive Management 'The Need'

- “...whatever restoration measures we take, the outcome is highly uncertain.” (Cairns 1990)
 - Its hard to predict accurately the response of habitat conditions to physical manipulations
 - Its hard to predict accurately the response of a species population to habitat conditions



Adaptive Management Defined

- AM is a decision making process that promotes flexible decision making in the face of uncertainty
- AM is most simply defined “*learn by doing*”
- AM is used when there are –
 - Critical decisions that demand action
 - Significant uncertainty around these decisions
- AM promotes shared learning



Stakeholder Involvement in Adaptive Management

The Adaptive Management process is designed to value and incorporate the knowledge and opinions of all participants.

- Diversity of interests, values and opinions promotes competing ideas and hypotheses
- Inclusion of competing interests through AM creates options for the future.

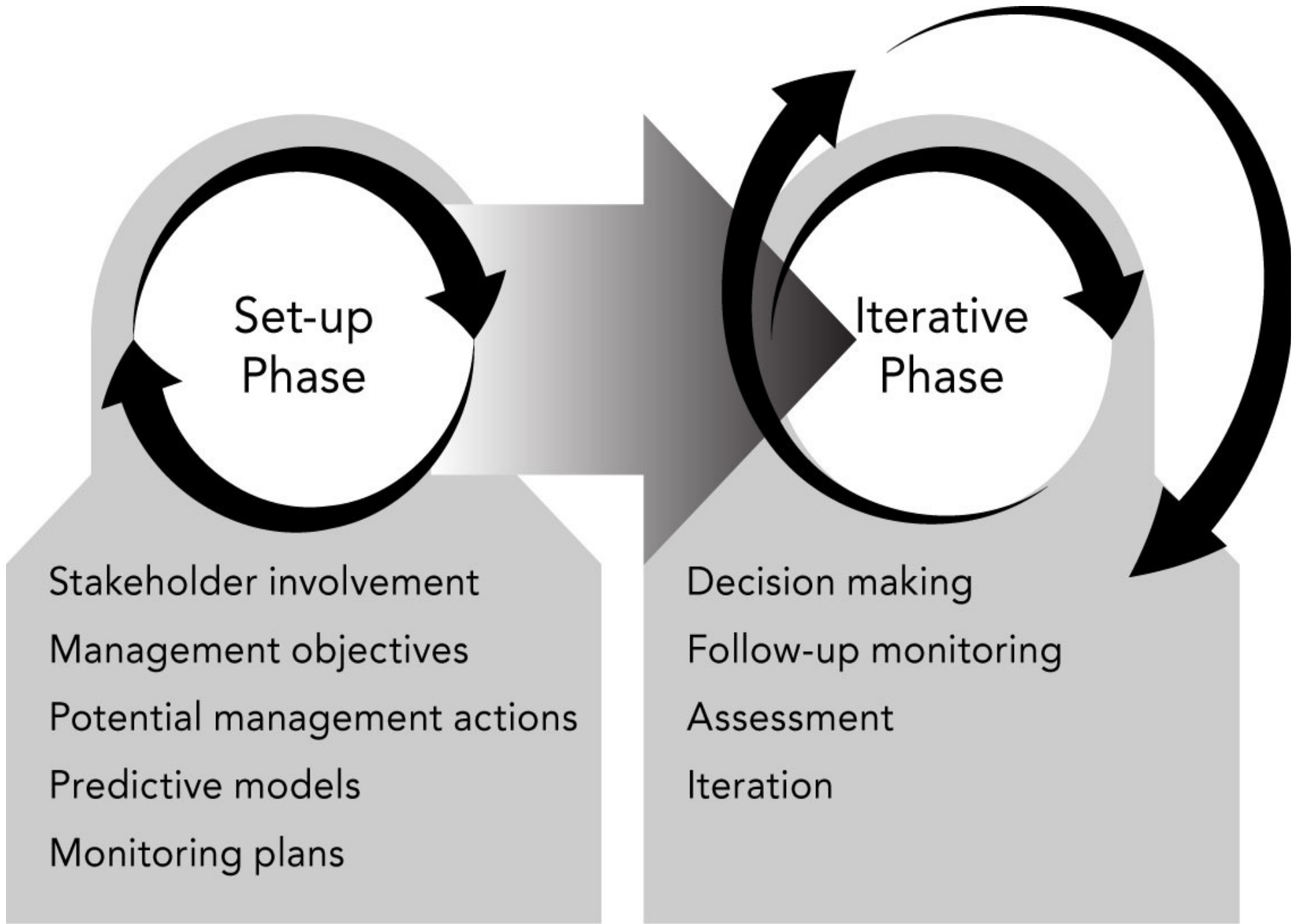


AM Guidance Document

Adaptive Management – The U.S. Department of Interior Technical Guide
(Williams et al. 2007)

- Phase 1: Setup (steps 1-5)
 1. Stakeholder Involvement
 2. Management Obj.'s
 3. Potential management actions
 4. Predictive models
 5. Monitoring plans

- Phase 2: Iterative (steps 6-9)
 6. Decision making
 7. Follow up monitoring
 8. Assessment
 9. Iteration





Adaptive Management Framework

- An AM framework –
 - Identifies critical uncertainties that affect decisions
 - Implements a systematic process to resolve uncertainties
 - Involves stakeholders and decision-makers

