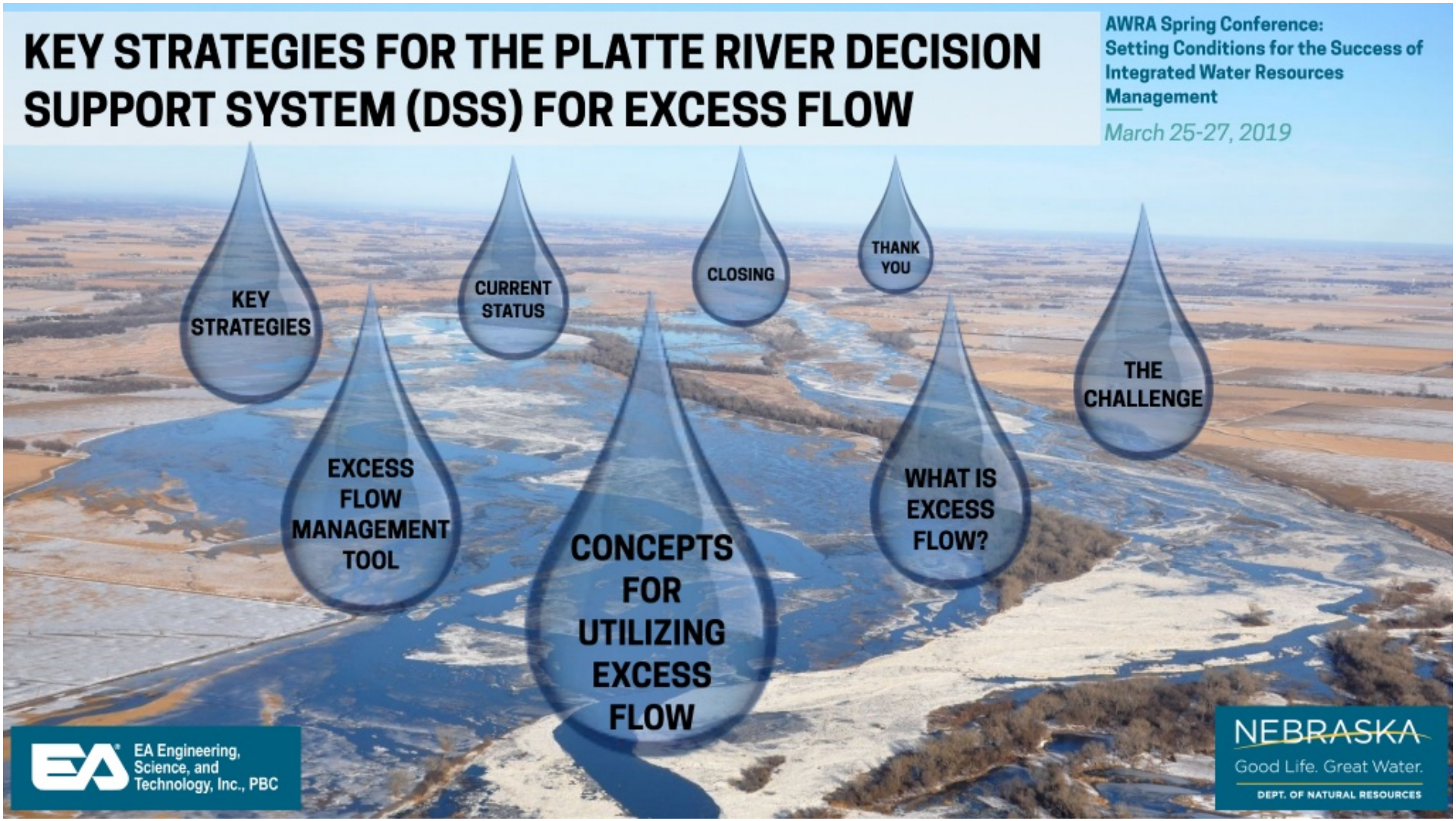
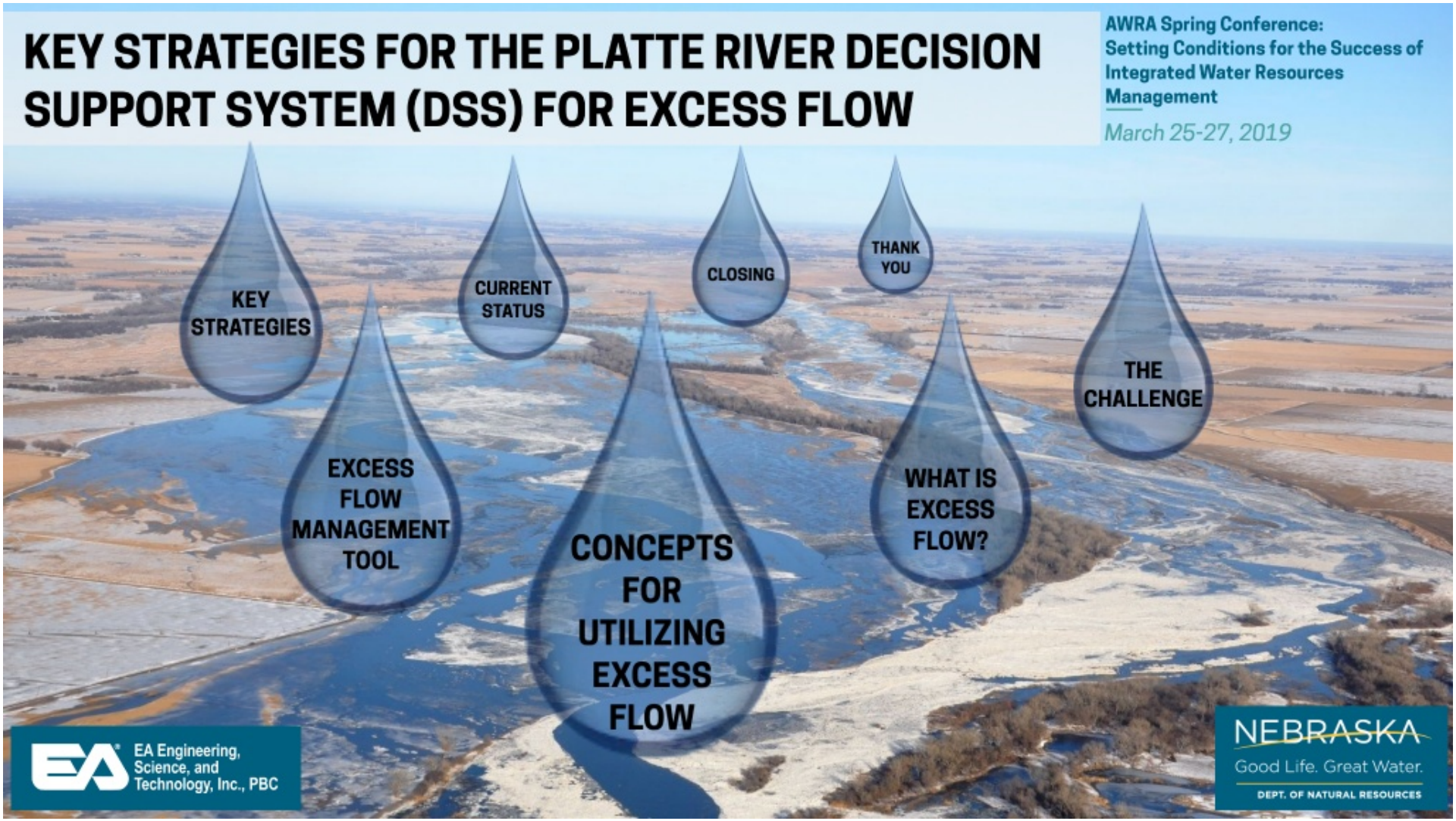

KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

How do we take conditions like this...

The Challenge...

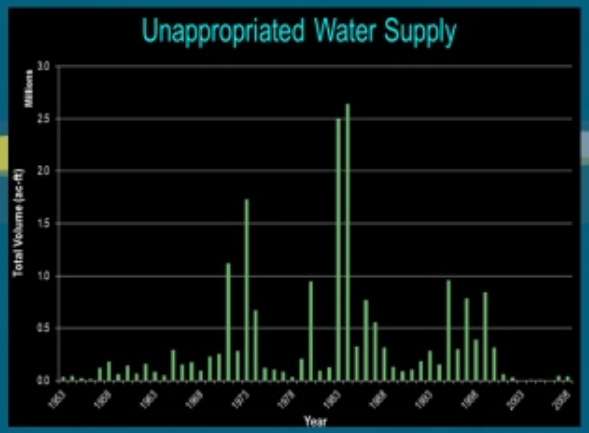
How do we take conditions like this...

to improve conditions like this?


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

What is Excess Flow?

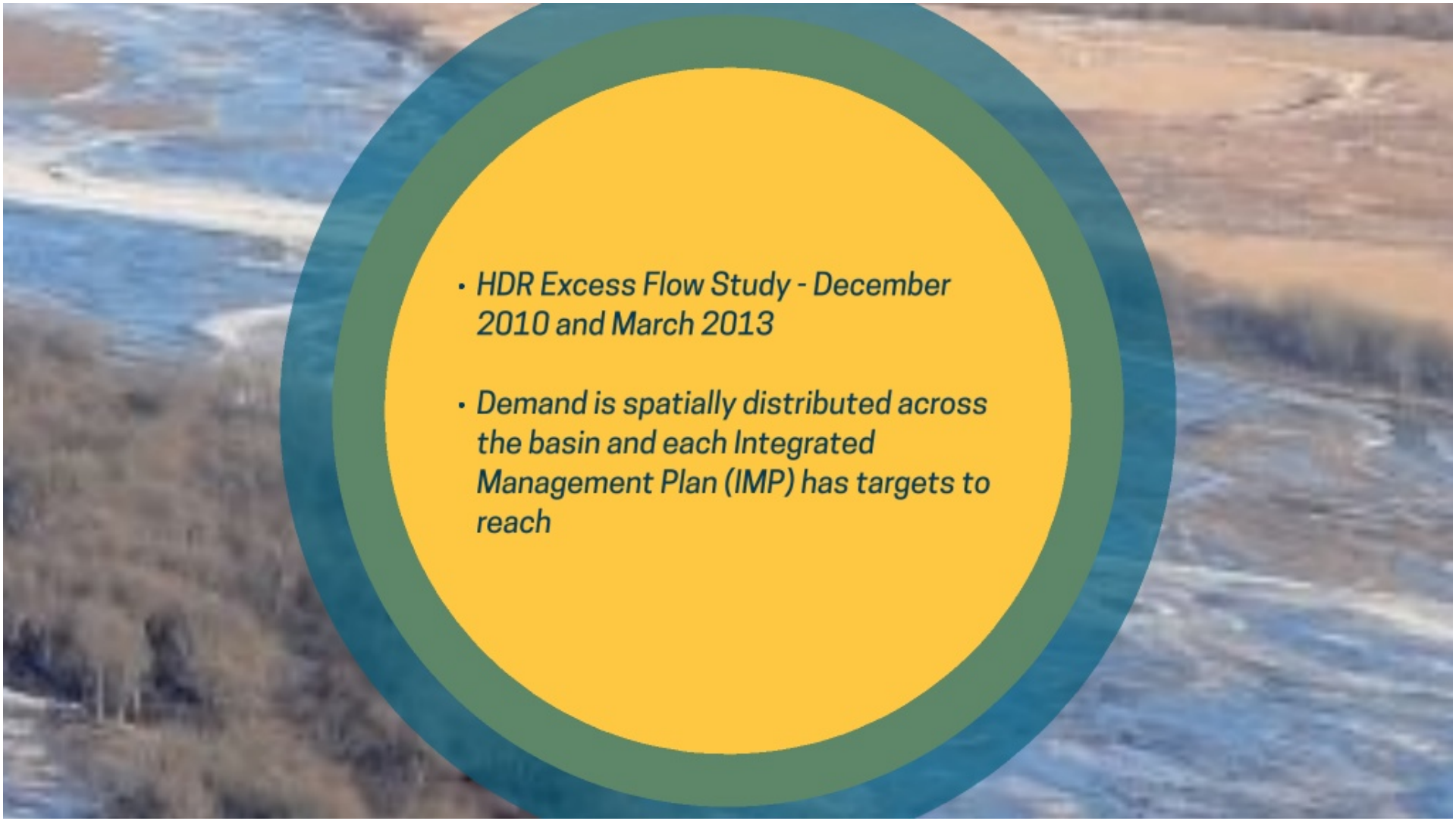
The quantity of natural flow available above the demand for natural flow

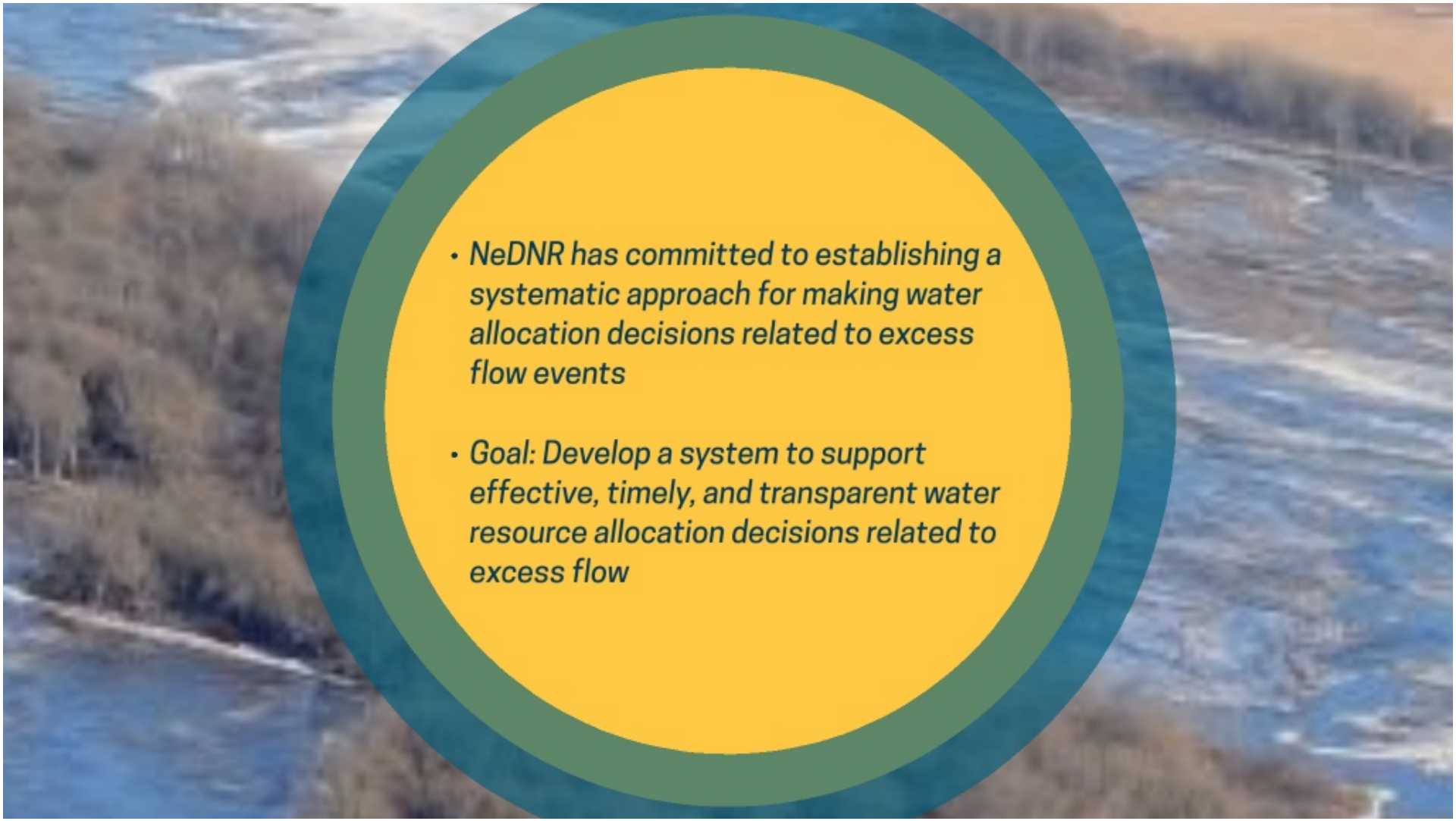


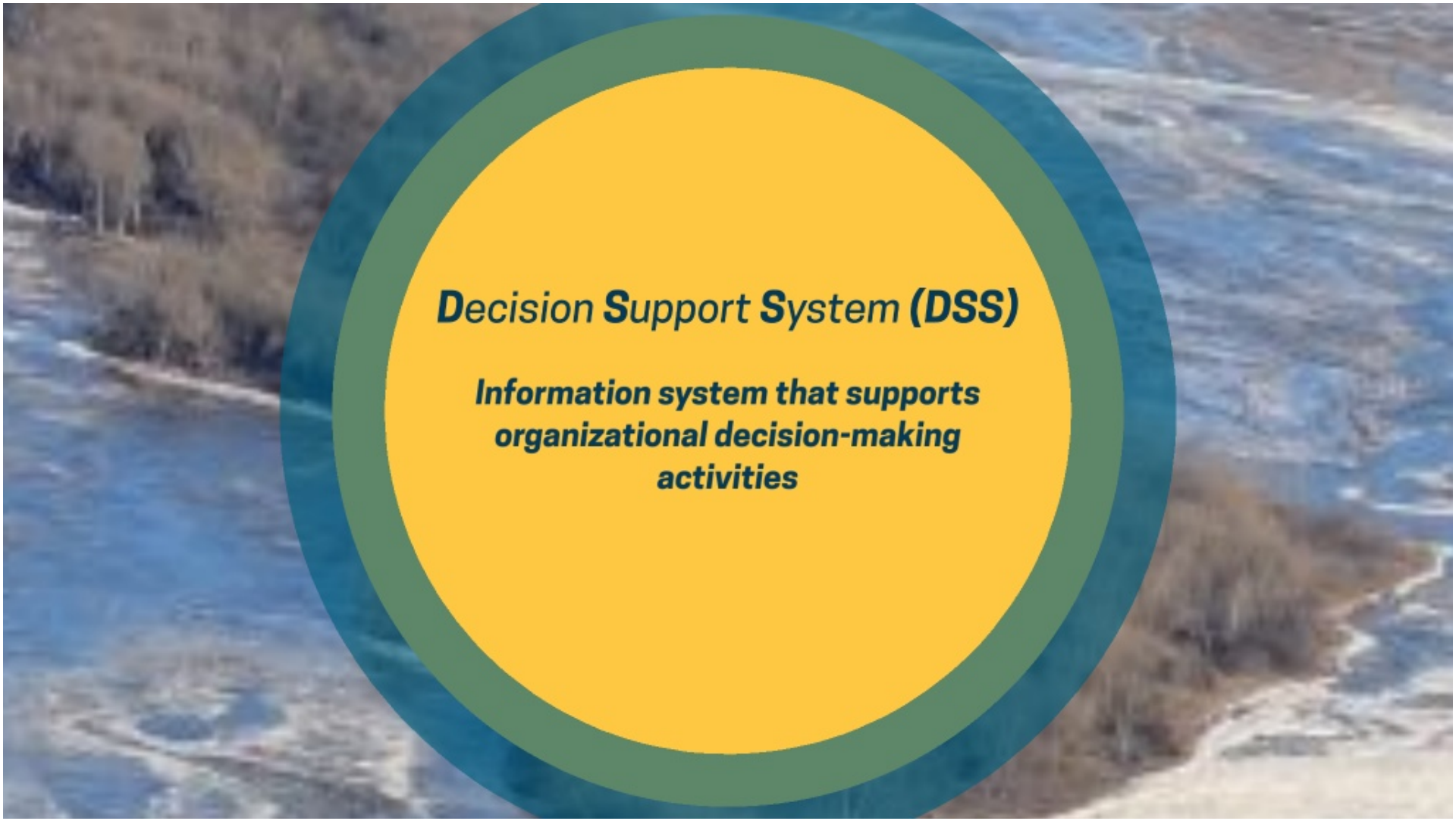
Background

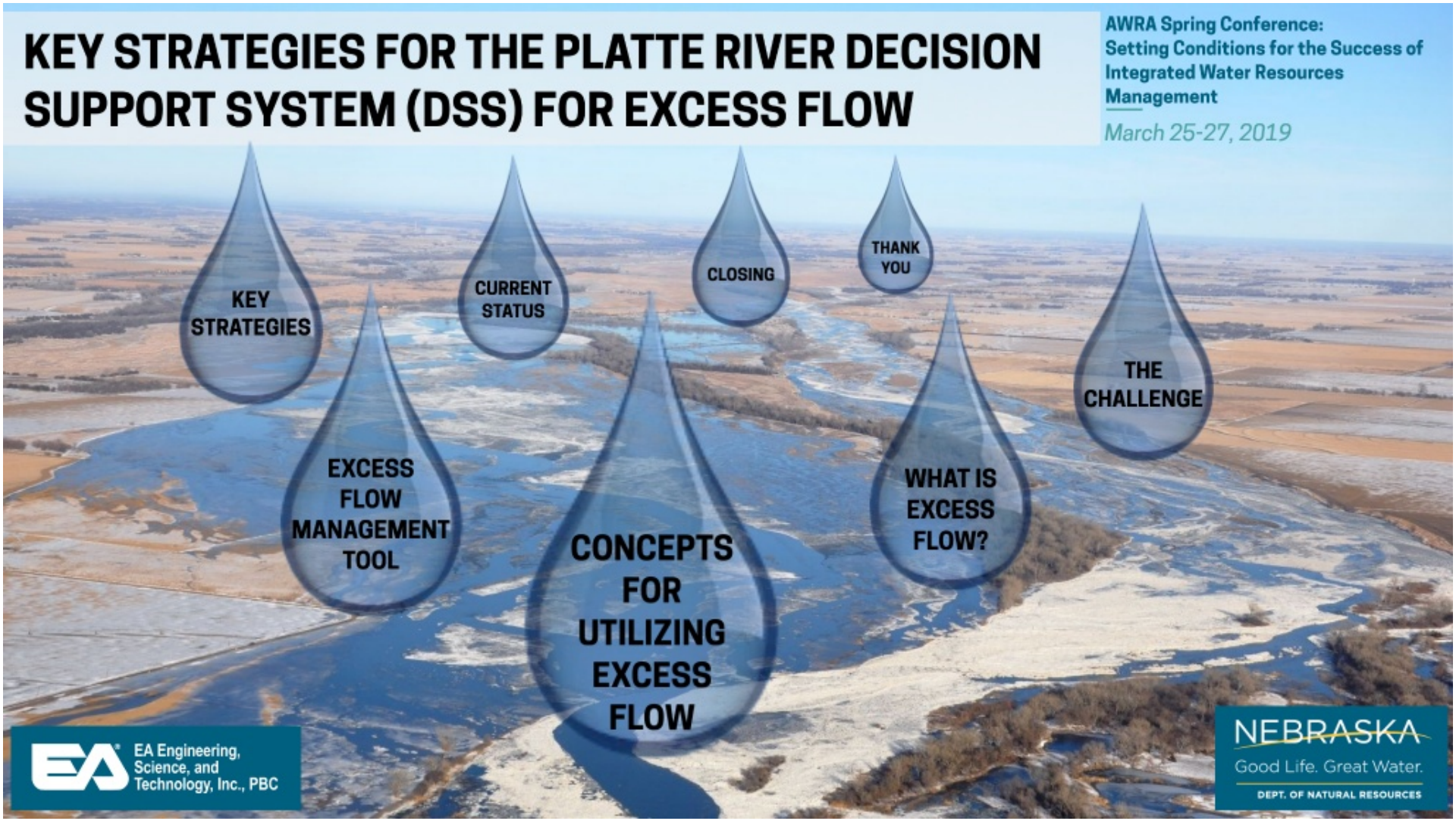
Systematic Approach

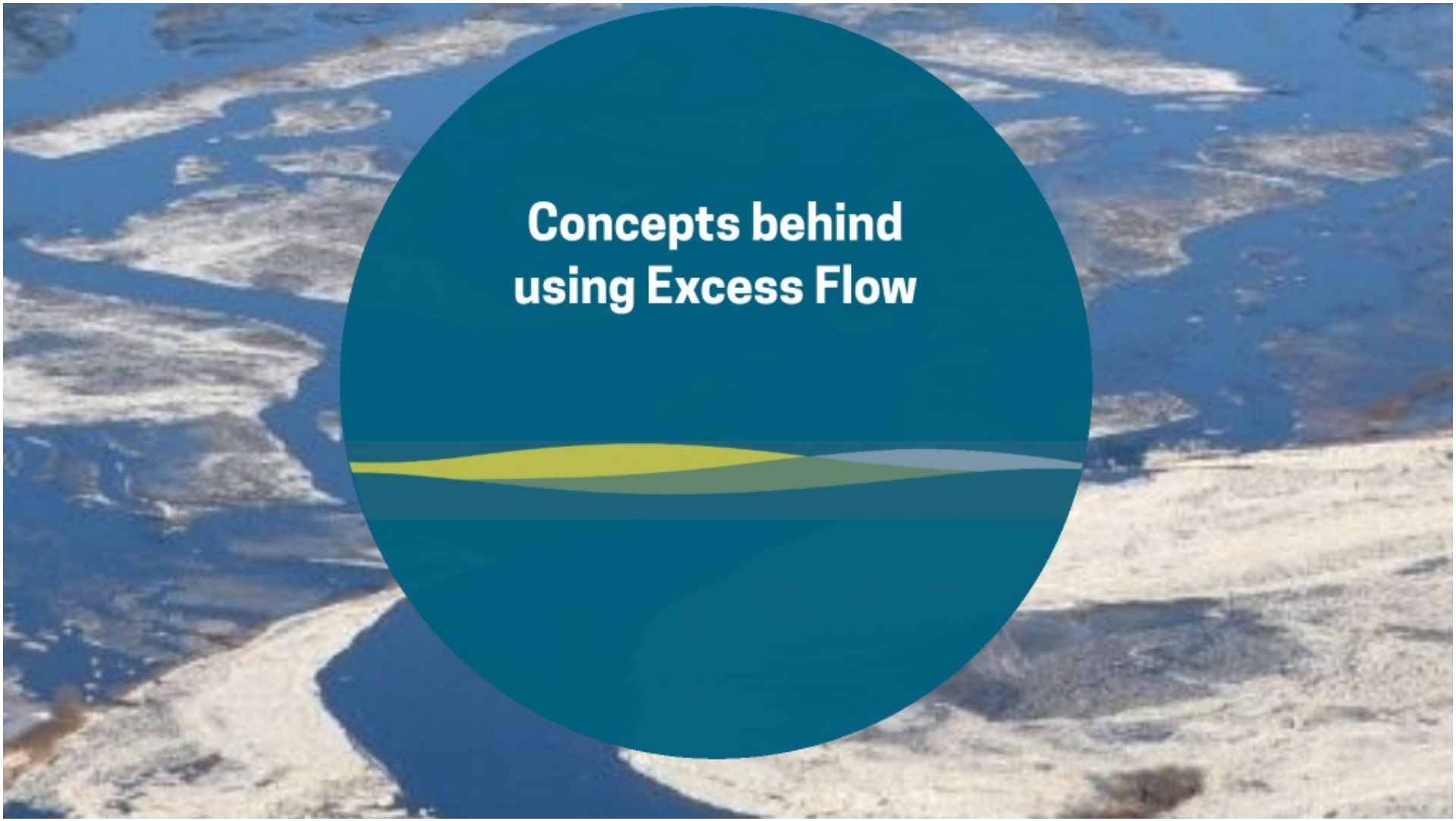
What is a DSS?


• HDR Excess Flow Study - December 2010 and March 2013
• Demand is spatially distributed across the basin and each Integrated Management Plan (IMP) has targets to reach


• NeDNR has committed to establishing a systematic approach for making water allocation decisions related to excess flow events
• Goal: Develop a system to support effective, timely, and transparent water resource allocation decisions related to excess flow


Decision Support System (DSS)
Information system that supports organizational decision-making activities


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES


Concepts behind
using Excess Flow

Concepts behind using Excess Flow

Divert & Store in times of Excess Flow

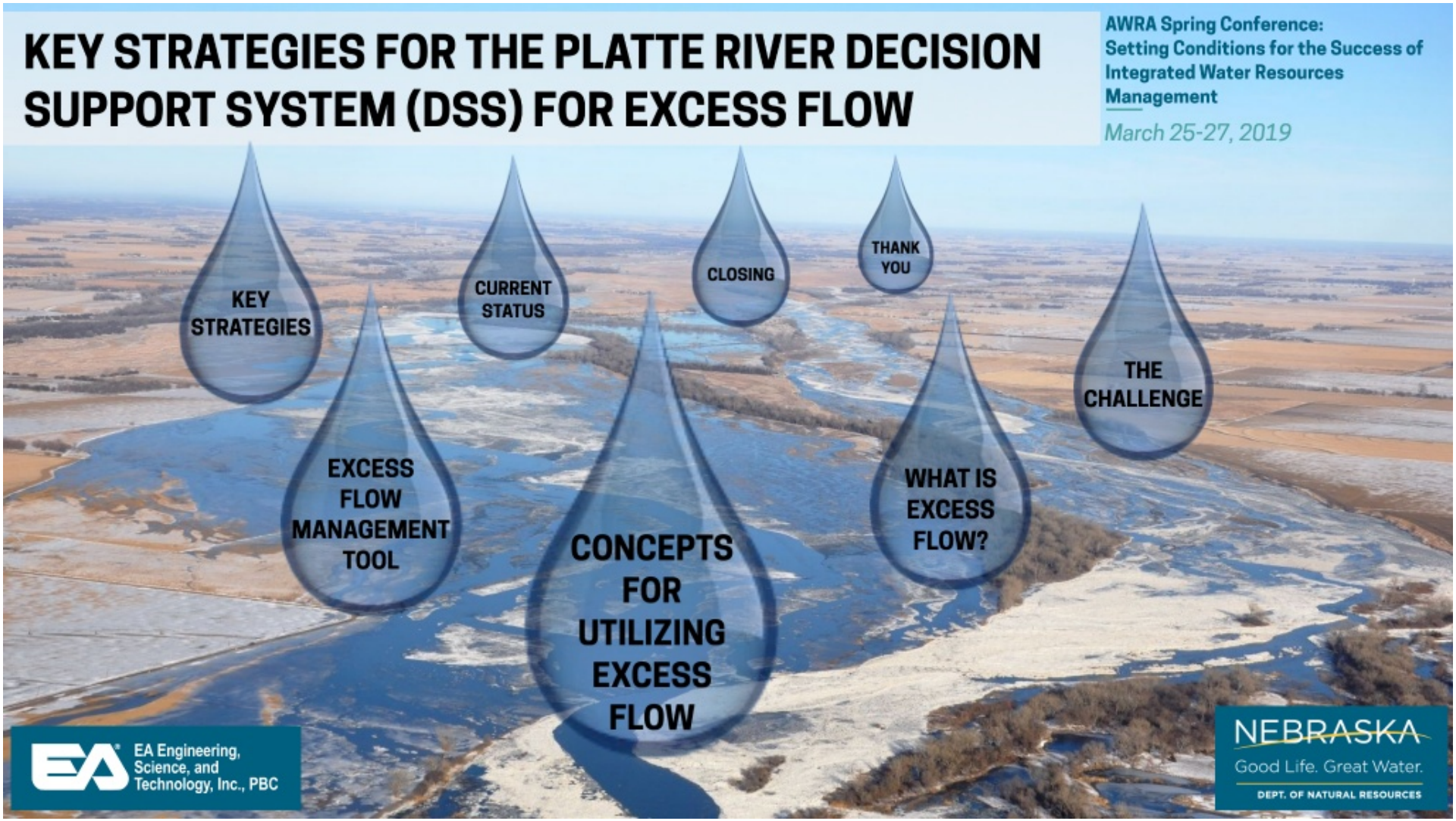

Concepts behind using Excess Flow
Divert & Store in times of Excess Flow
Return to the river in times of shortage

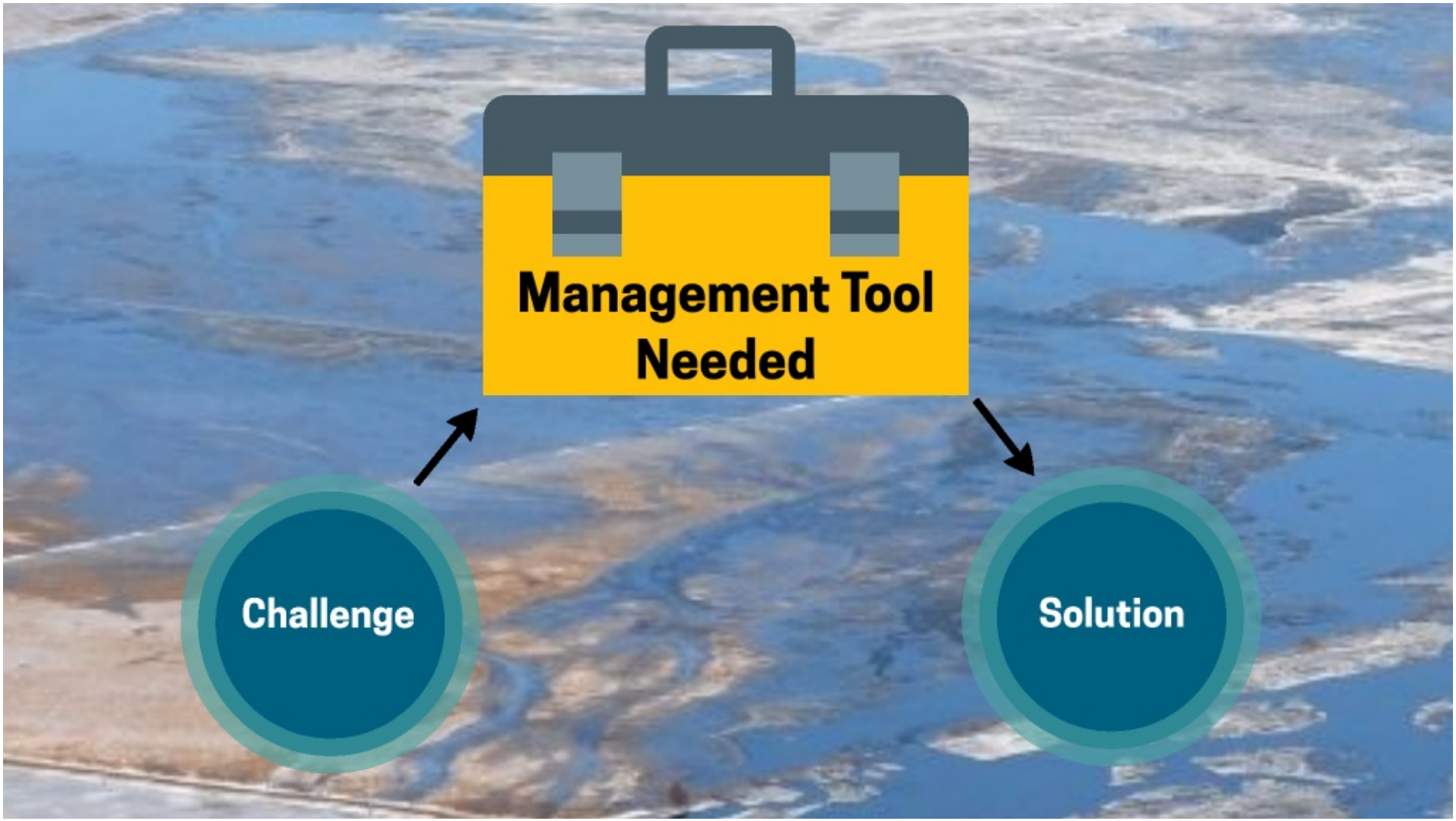
Concepts behind using Excess Flow

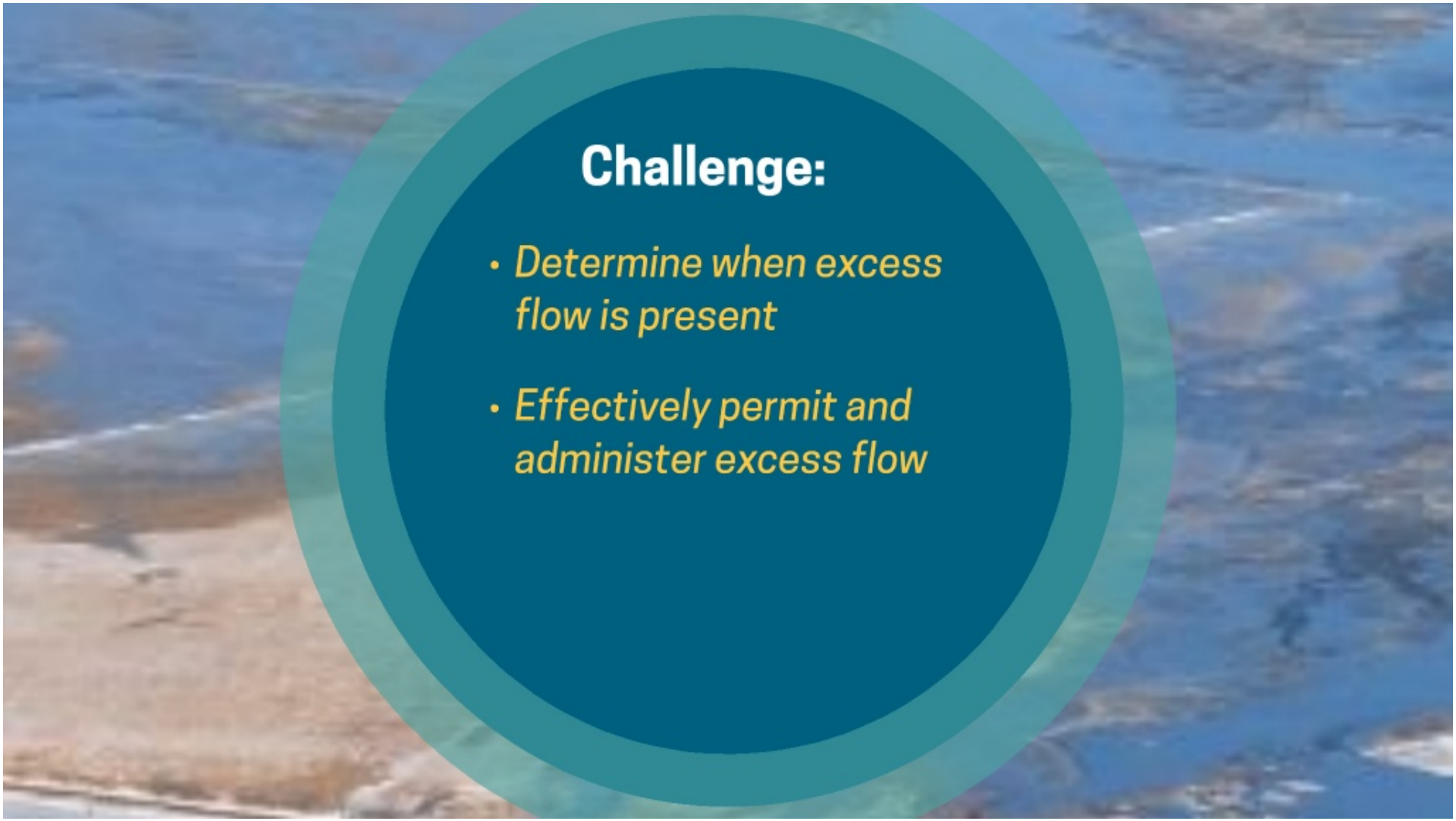
- Divert & Store in times of Excess Flow
- Return to the river in times of shortage
- New reservoirs are difficult to construct

Concepts behind using Excess Flow

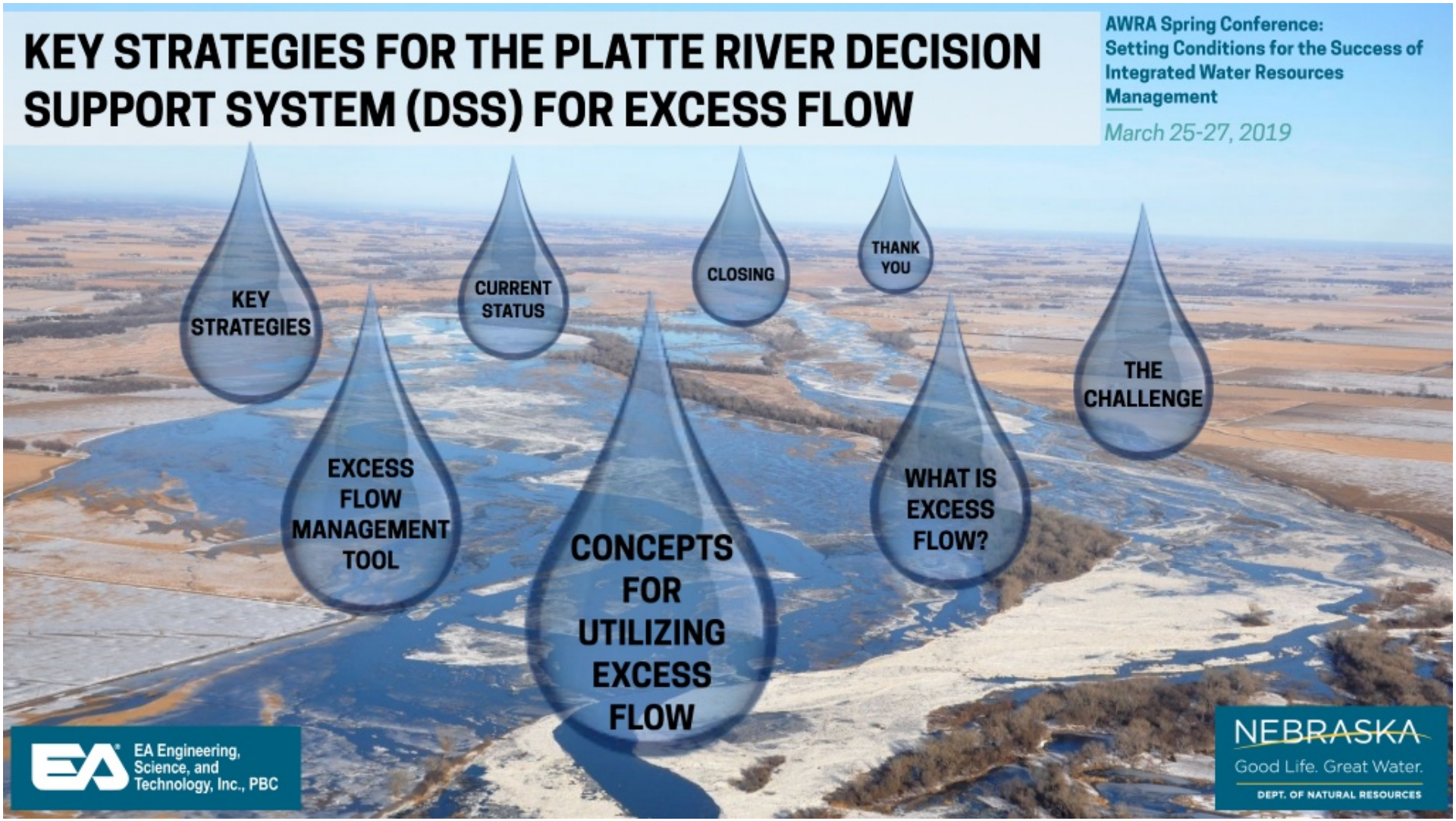
- Divert & Store in times of Excess Flow
- Return to the river in times of shortage
- New reservoirs are difficult to construct
- Off-channel storage concept


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES


Management Tool Needed
Challenge
Solution


Challenge:
• Determine when excess flow is present
• Effectively permit and administer excess flow

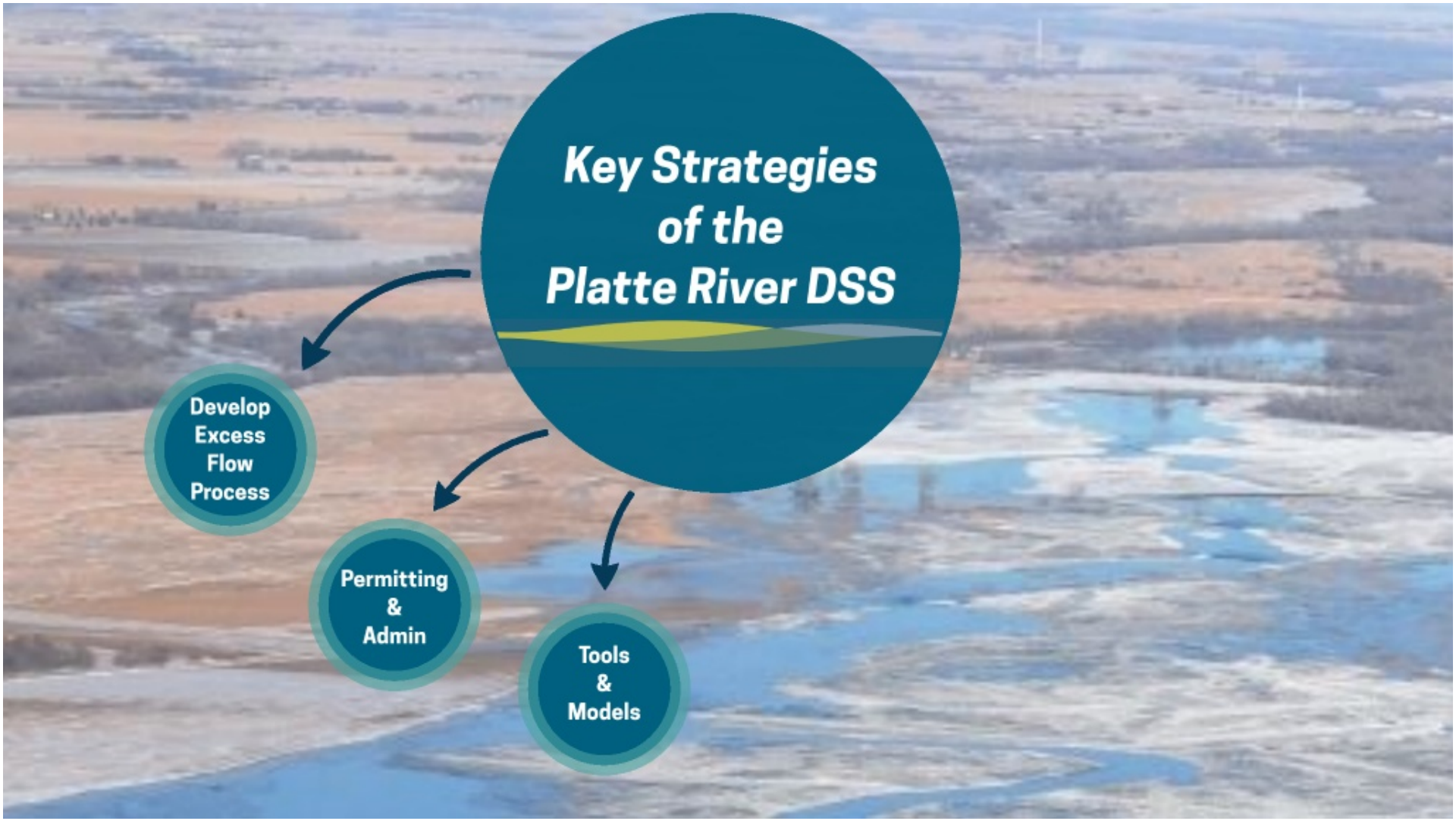

Solution:
• Platte River DSS
• Development started May 2018
• Consultant team: EA and RESPEC
EA Engineering, Science, and Technology, Inc., PBC
RESPEC

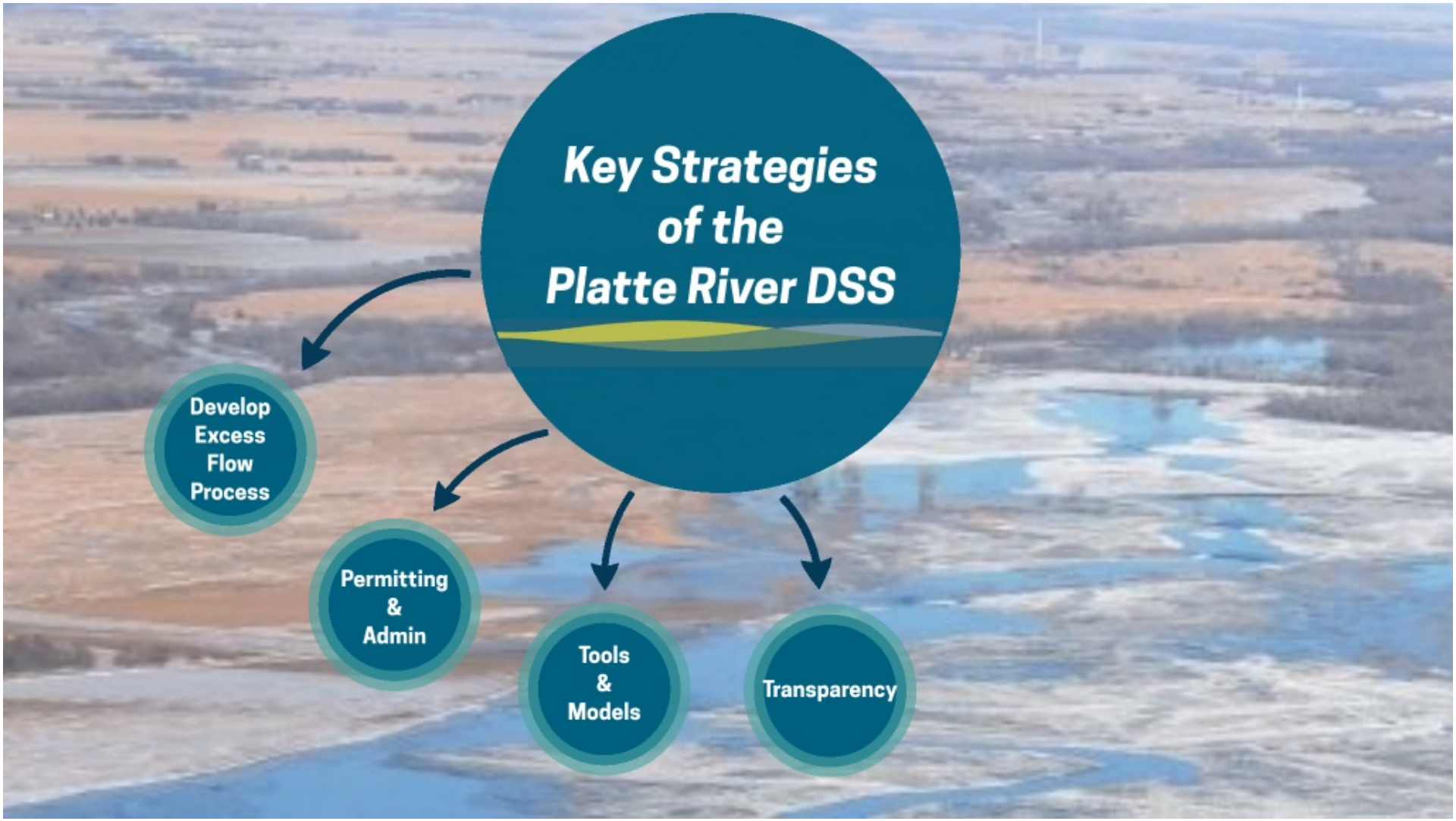

KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

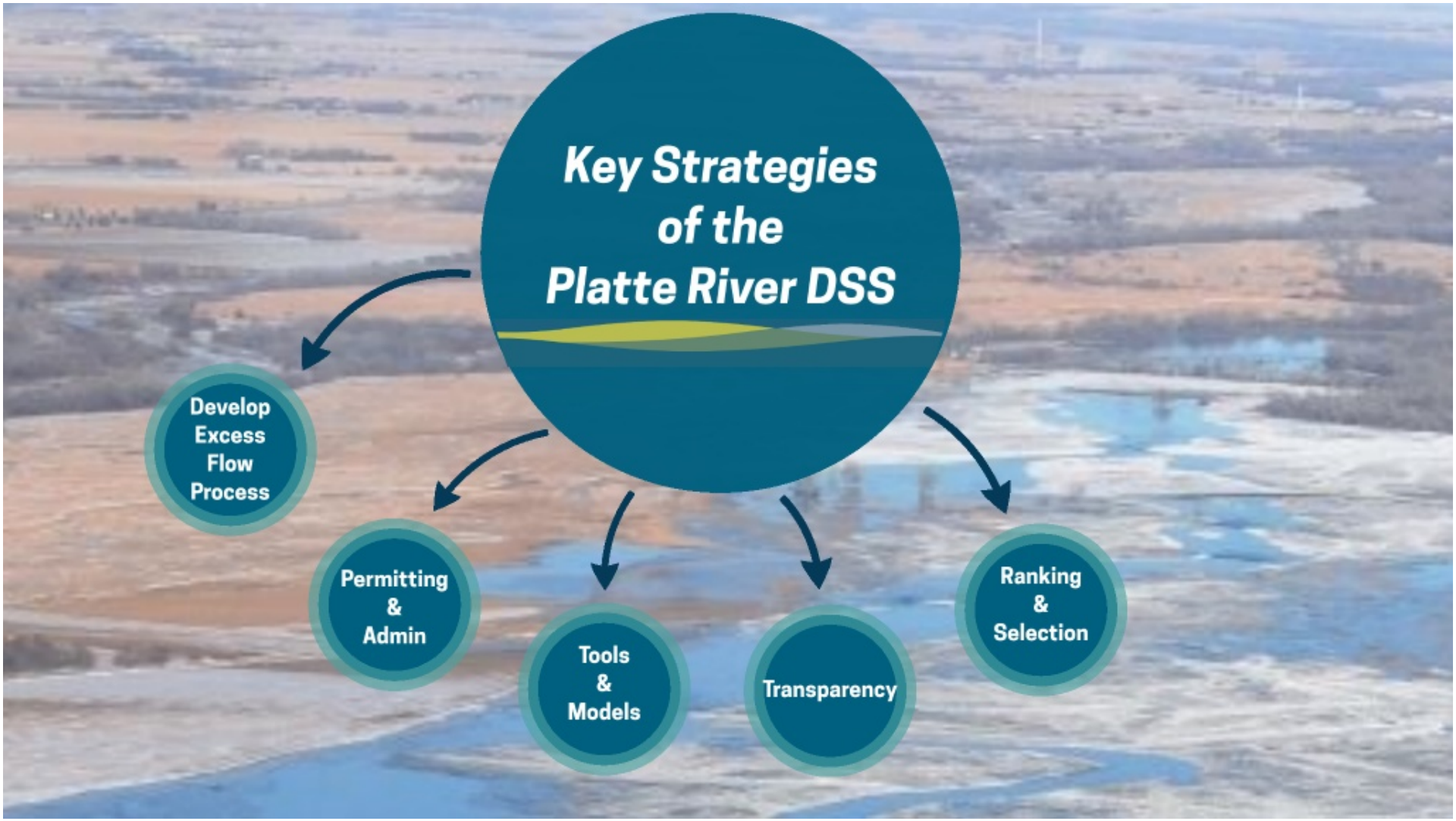

Key Strategies
of the
Platte River DSS

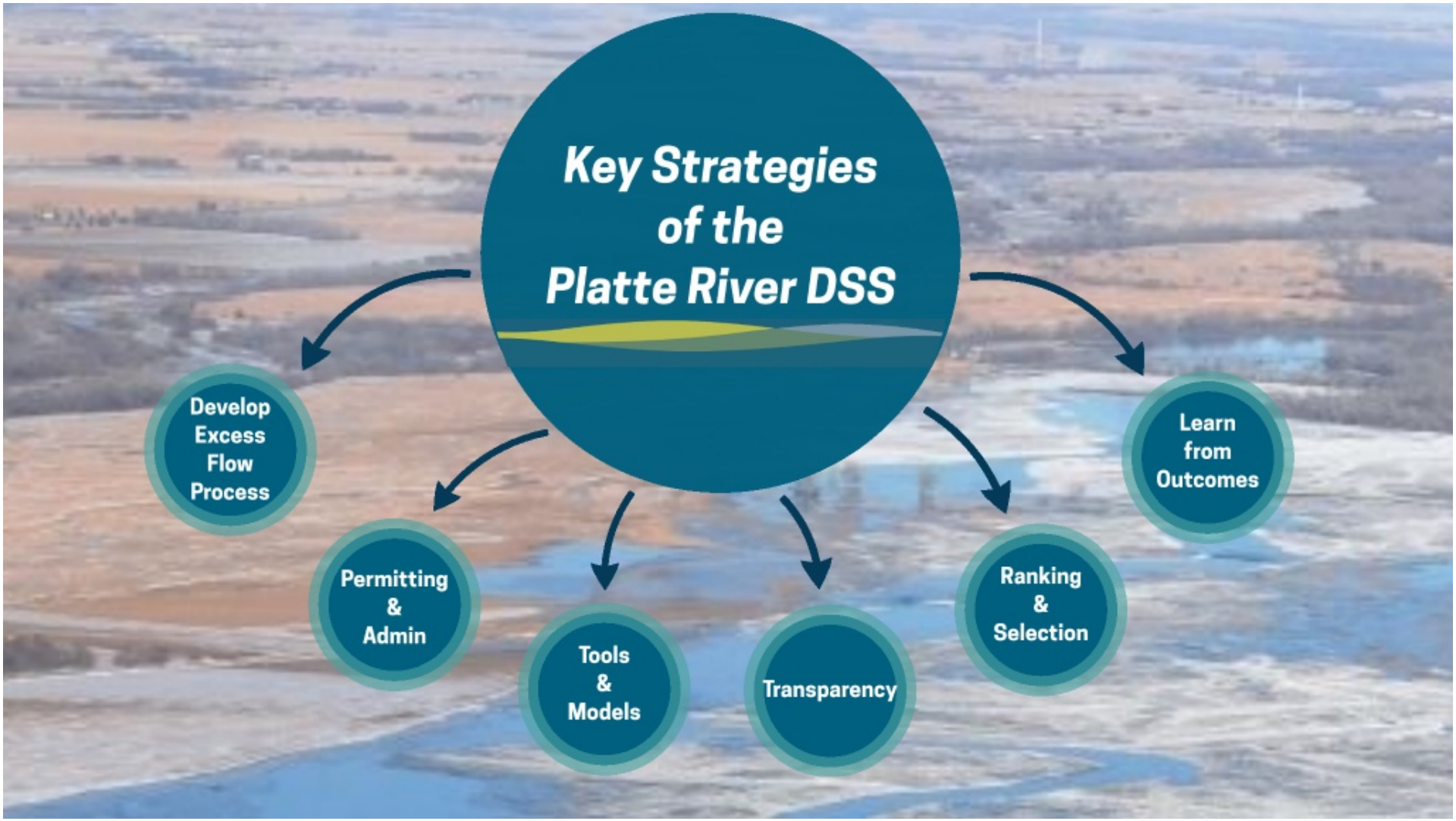

Key Strategies of the Platte River DSS
Develop Excess Flow Process


Key Strategies of the Platte River DSS
Develop Excess Flow Process
Permitting & Admin


Key Strategies of the Platte River DSS
Develop Excess Flow Process
Permitting & Admin
Tools & Models

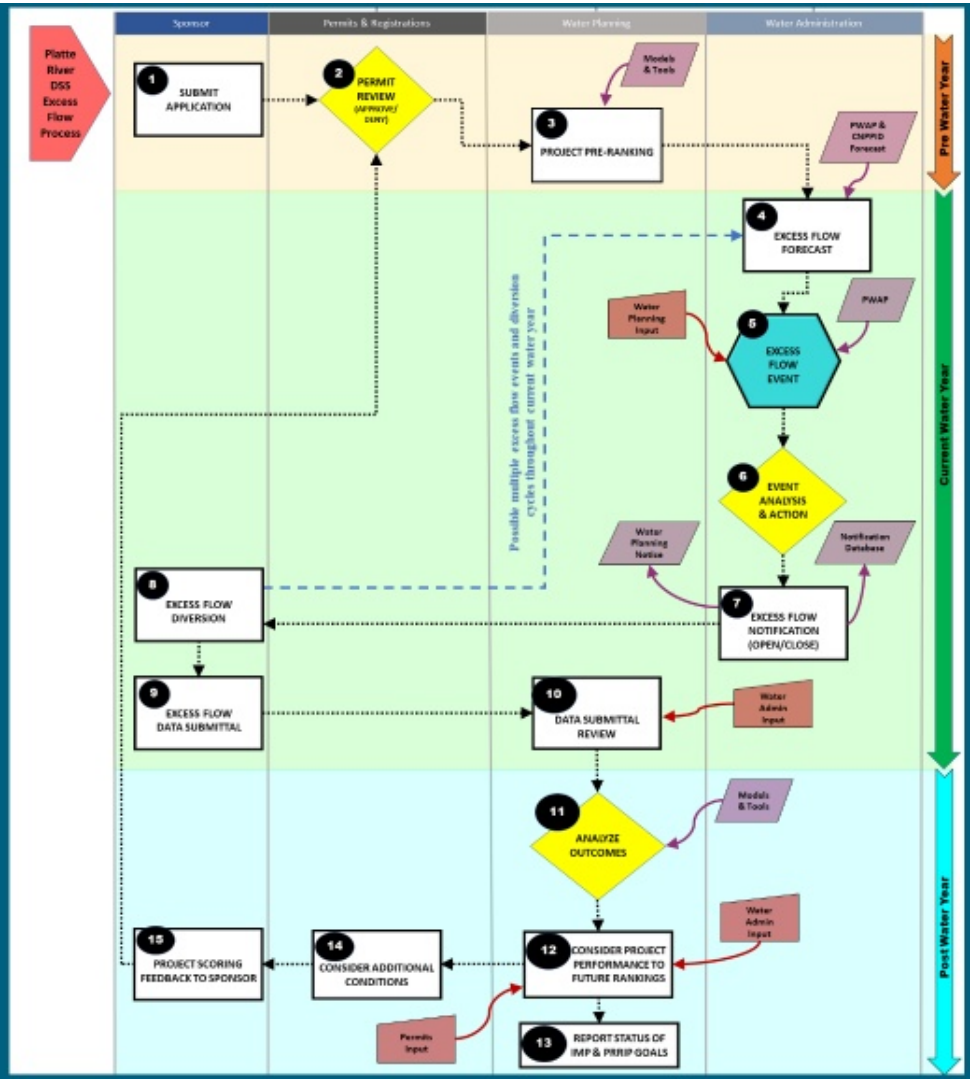

Key Strategies of the Platte River DSS
Develop Excess Flow Process
Permitting & Admin
Tools & Models
Transparency

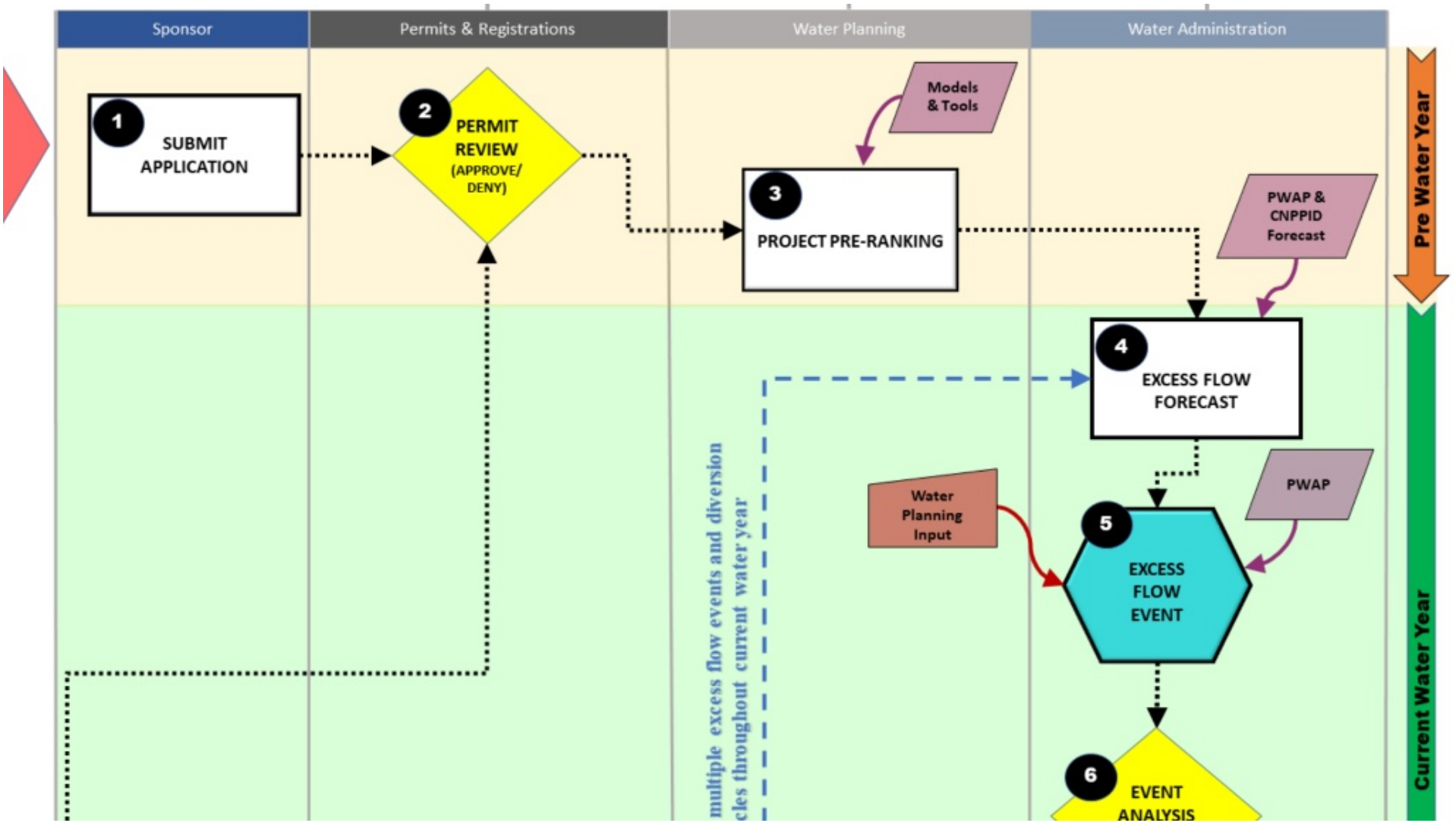

Key Strategies of the Platte River DSS
Develop Excess Flow Process
Permitting & Admin
Tools & Models
Transparency
Ranking & Selection

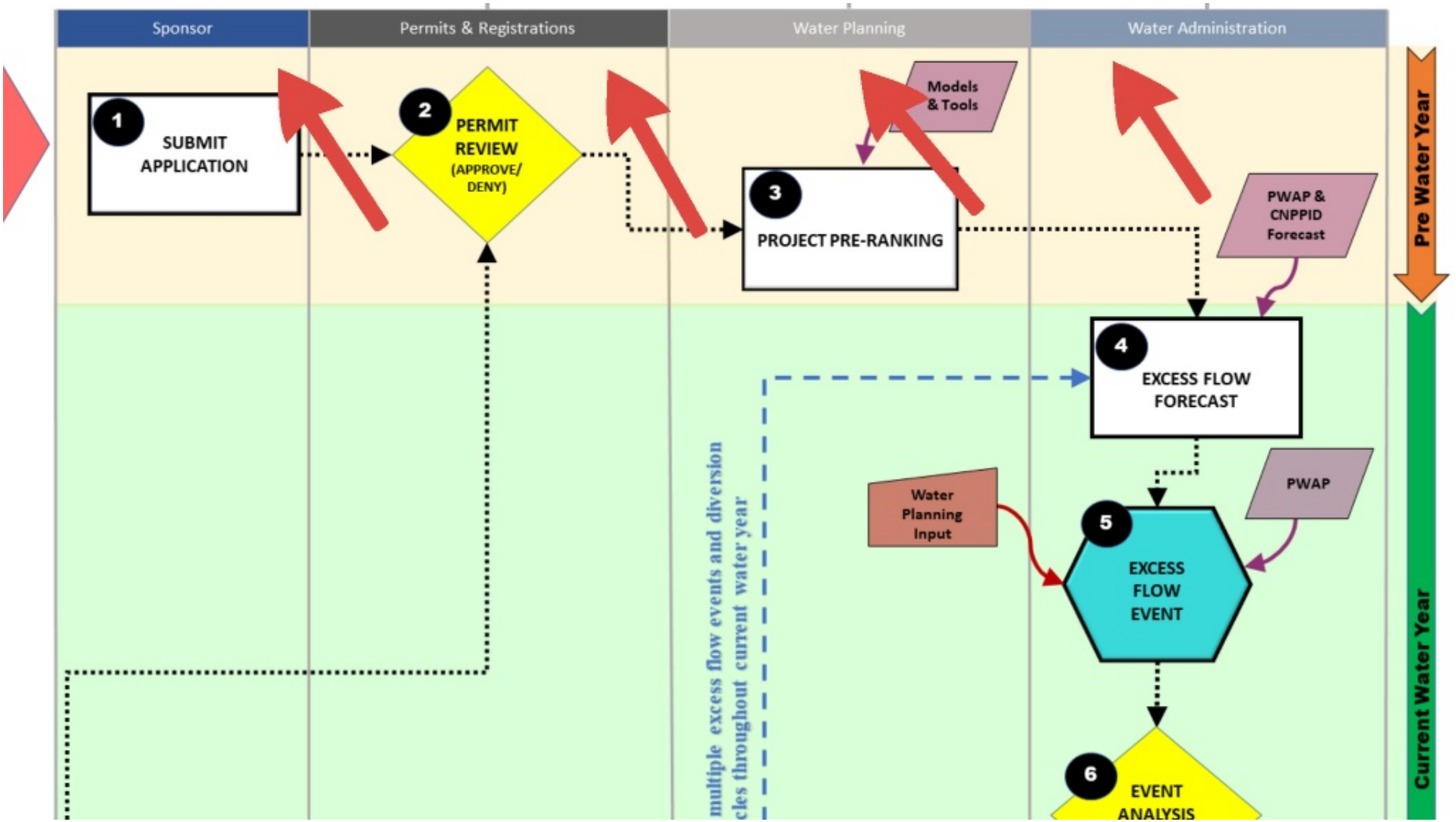

Key Strategies of the Platte River DSS
Develop Excess Flow Process
Permitting & Admin
Tools & Models
Transparency
Ranking & Selection
Learn from Outcomes

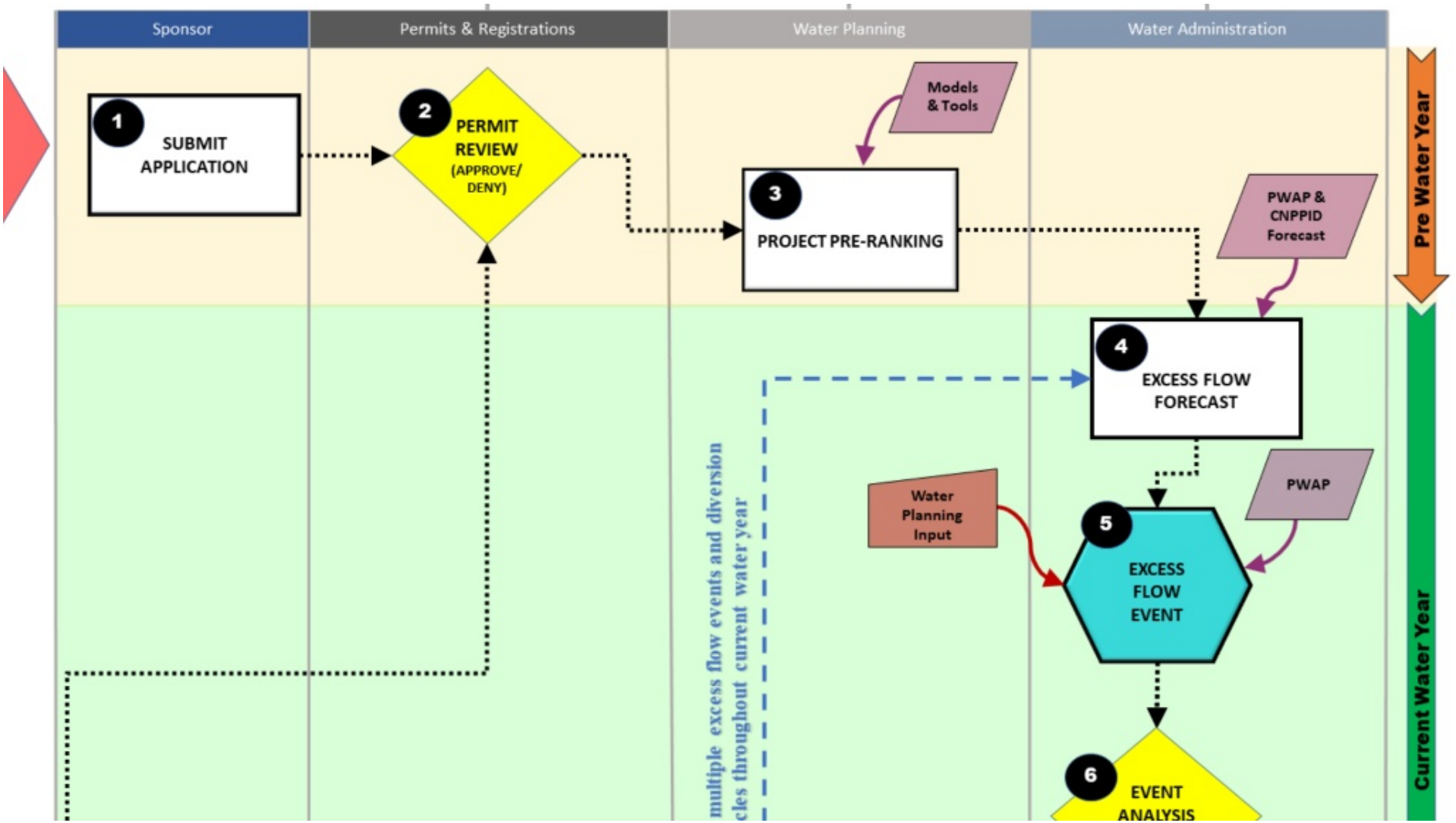
Platte River DSS Excess Flow Process

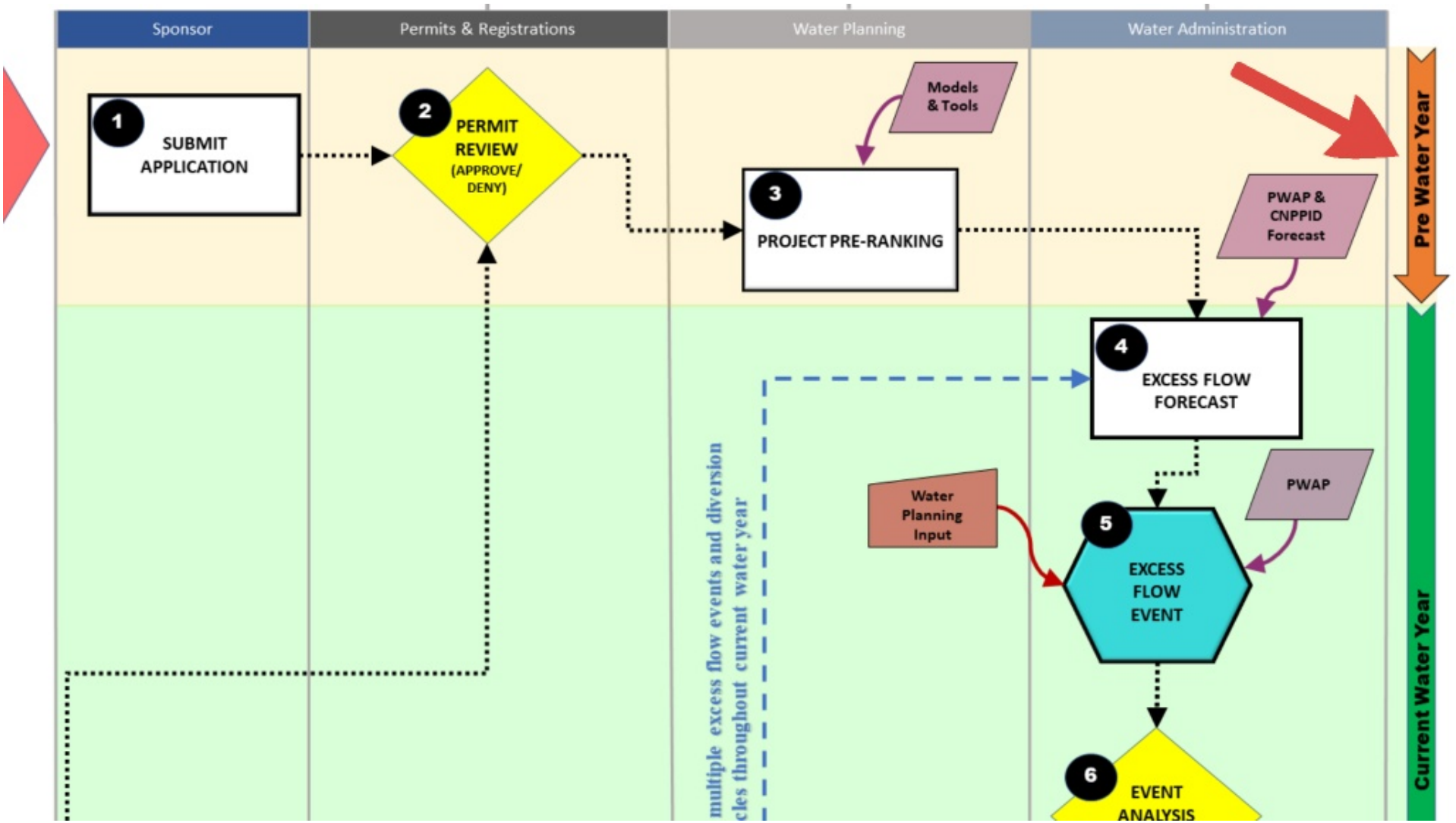
- *Utilized an intense Design Sprint approach to develop the process*
- *Determined annual actions, excess flow event actions and timing of the actions*
- *Identified responsibilities within the "swim lanes" of each NeDNR division or sponsor*

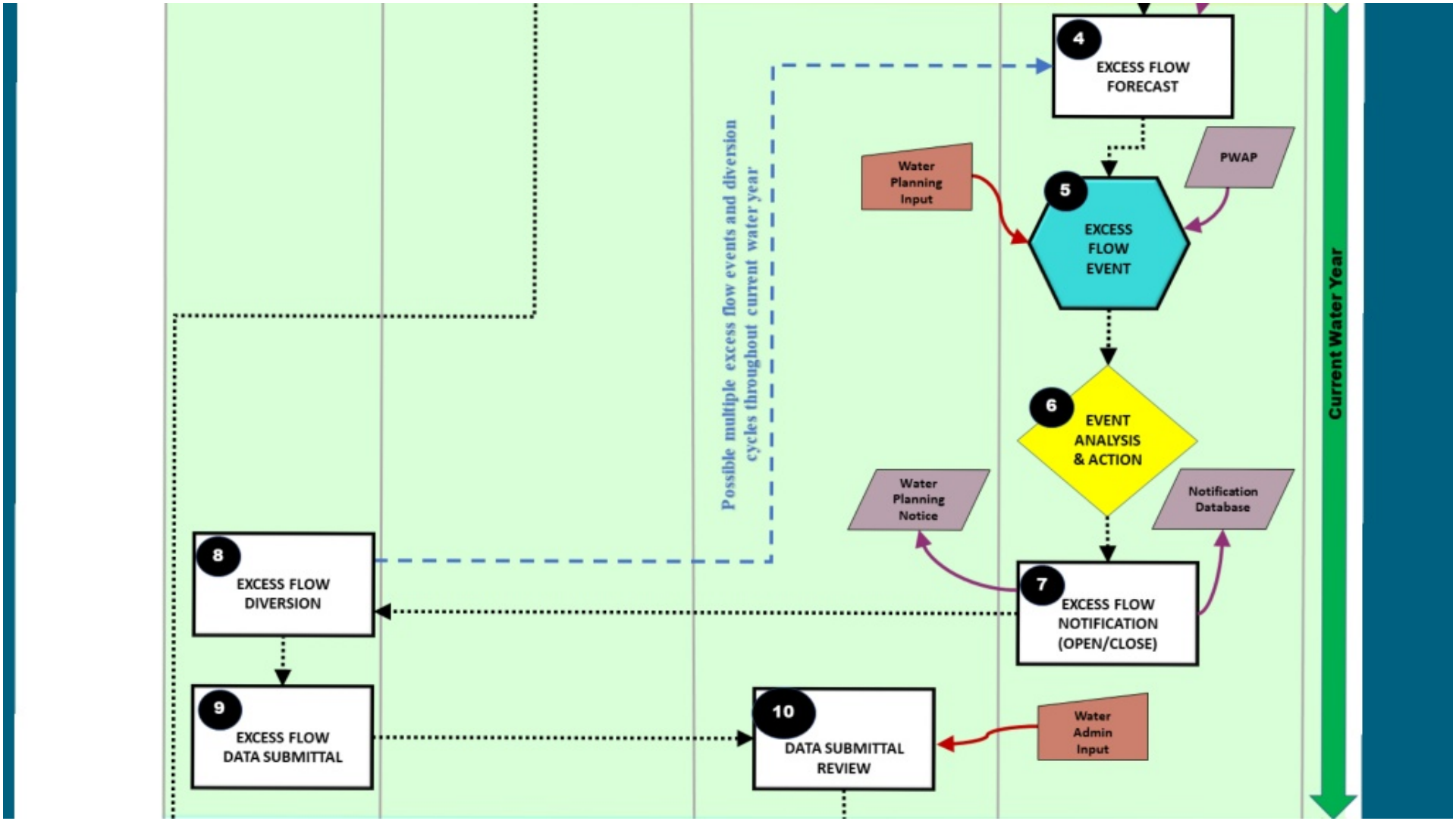


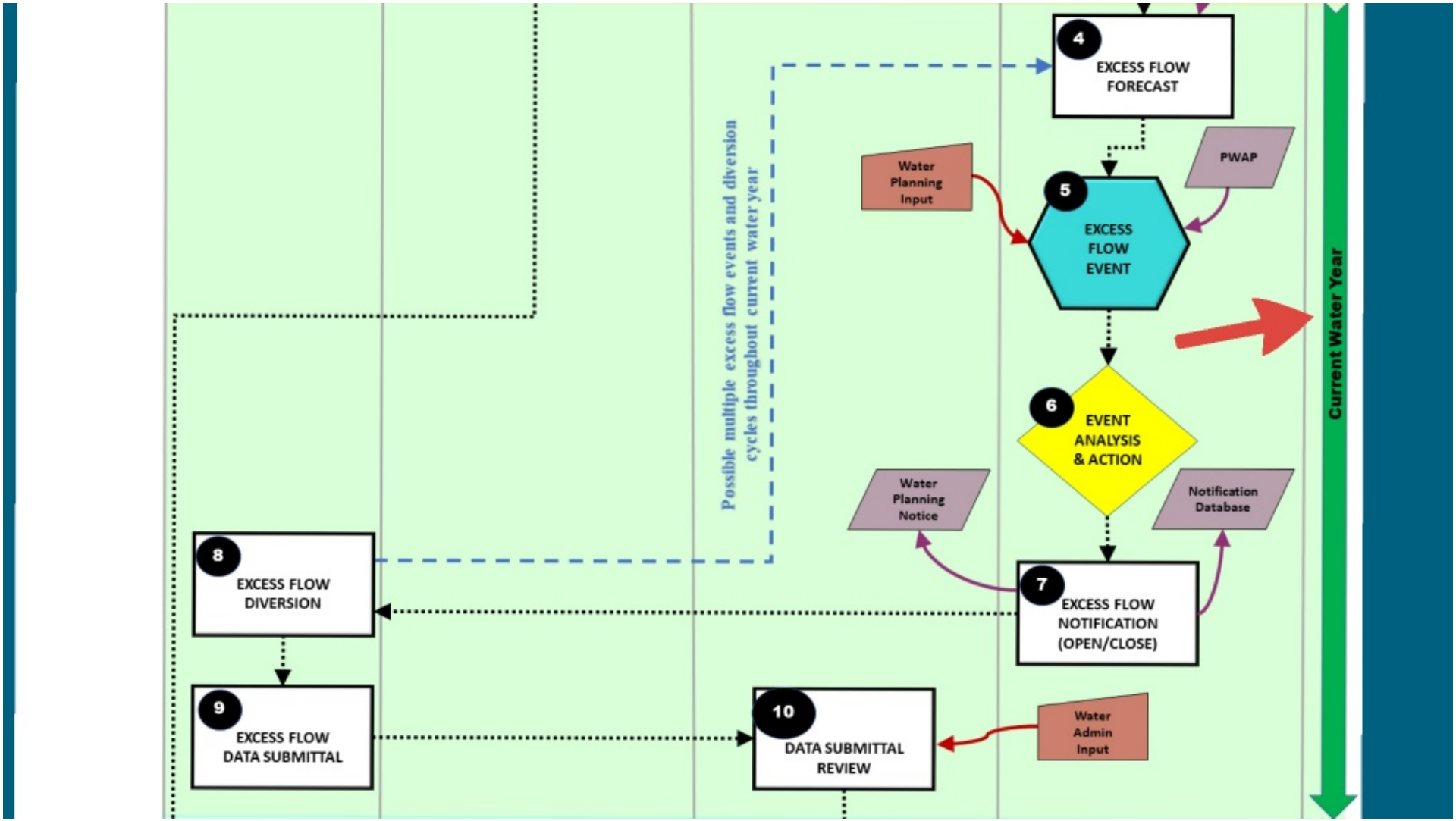

Sponsor
Permits & Registrations
Water Planning
Water Administration
1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
multiple excess flow events and diversion
cles throughout current water year
6
EVENT ANALYSIS
Current Water Year

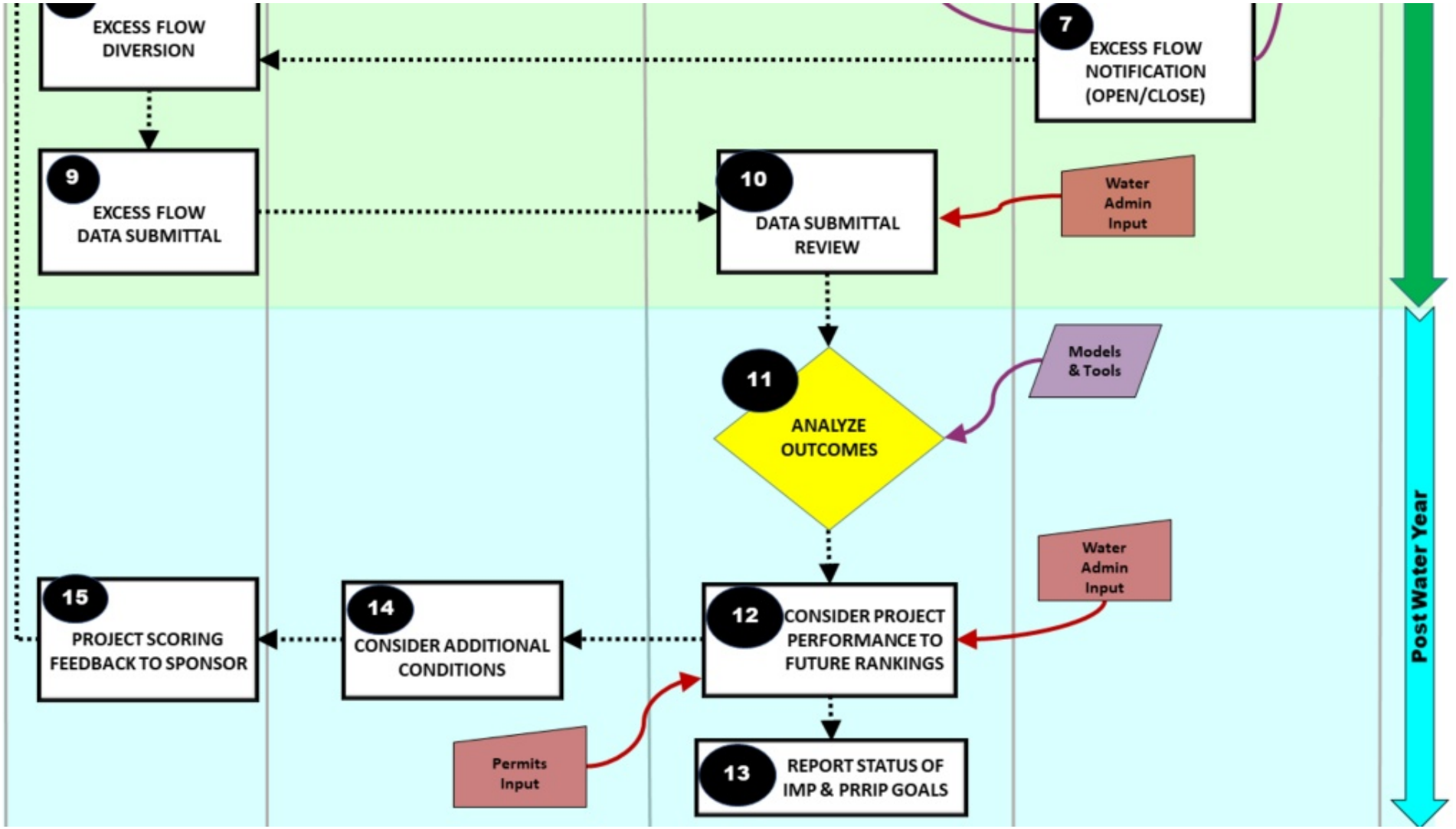

Sponsor
Permits & Registrations
Water Planning
Water Administration
1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
3
PROJECT PRE-RANKING
Models & Tools
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
6
EVENT ANALYSIS
Current Water Year
multiple excess flow events and diversion
cles throughout current water year

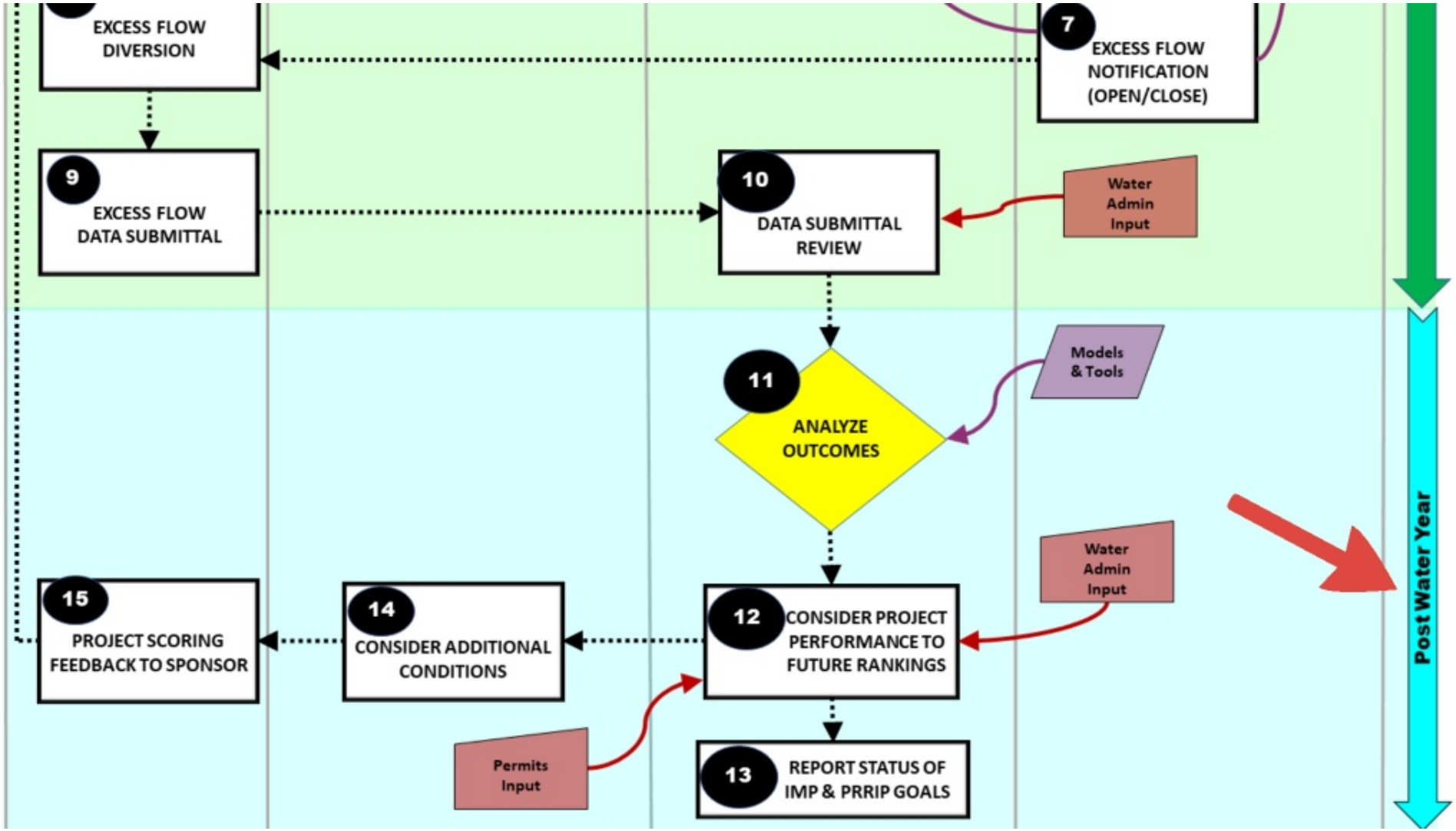

Sponsor
Permits & Registrations
Water Planning
Water Administration
1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
multiple excess flow events and diversion
cles throughout current water year
6
EVENT ANALYSIS
Current Water Year


Sponsor
Permits & Registrations
Water Planning
Water Administration
1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
multiple excess flow events and diversion
cles throughout current water year
6
EVENT ANALYSIS
Current Water Year


4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
8
EXCESS FLOW DIVERSION
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
Possible multiple excess flow events and diversion cycles throughout current water year
Current Water Year

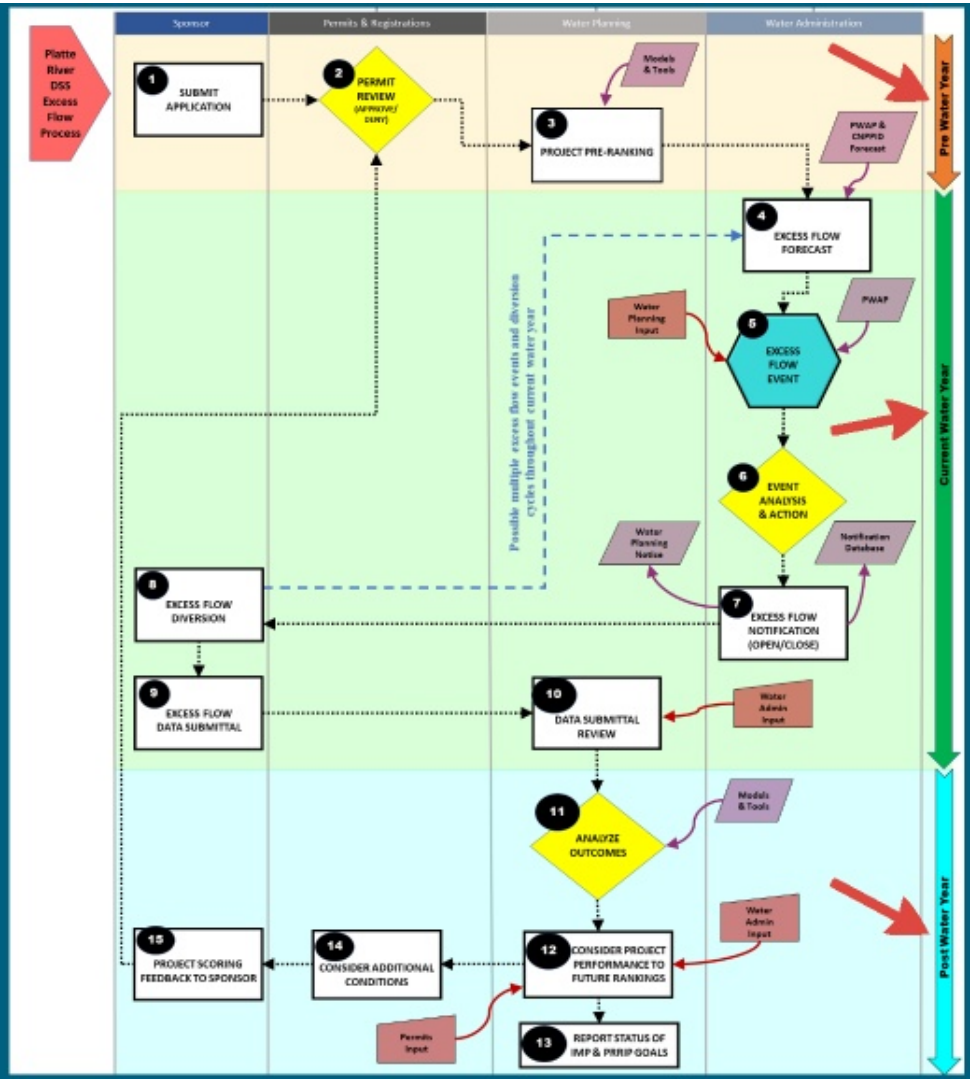

4
EXCESS FLOW FORECAST
PWAP
Water Planning Input
5
EXCESS FLOW EVENT
Possible multiple excess flow events and diversion cycles throughout current water year
Current Water Year
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
8
EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input


EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
CONSIDER ADDITIONAL CONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Water Admin Input
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS
Post Water Year


EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
CONSIDER ADDITIONAL CONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Water Admin Input
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS
Post Water Year

Platte River DSS Excess Flow Process

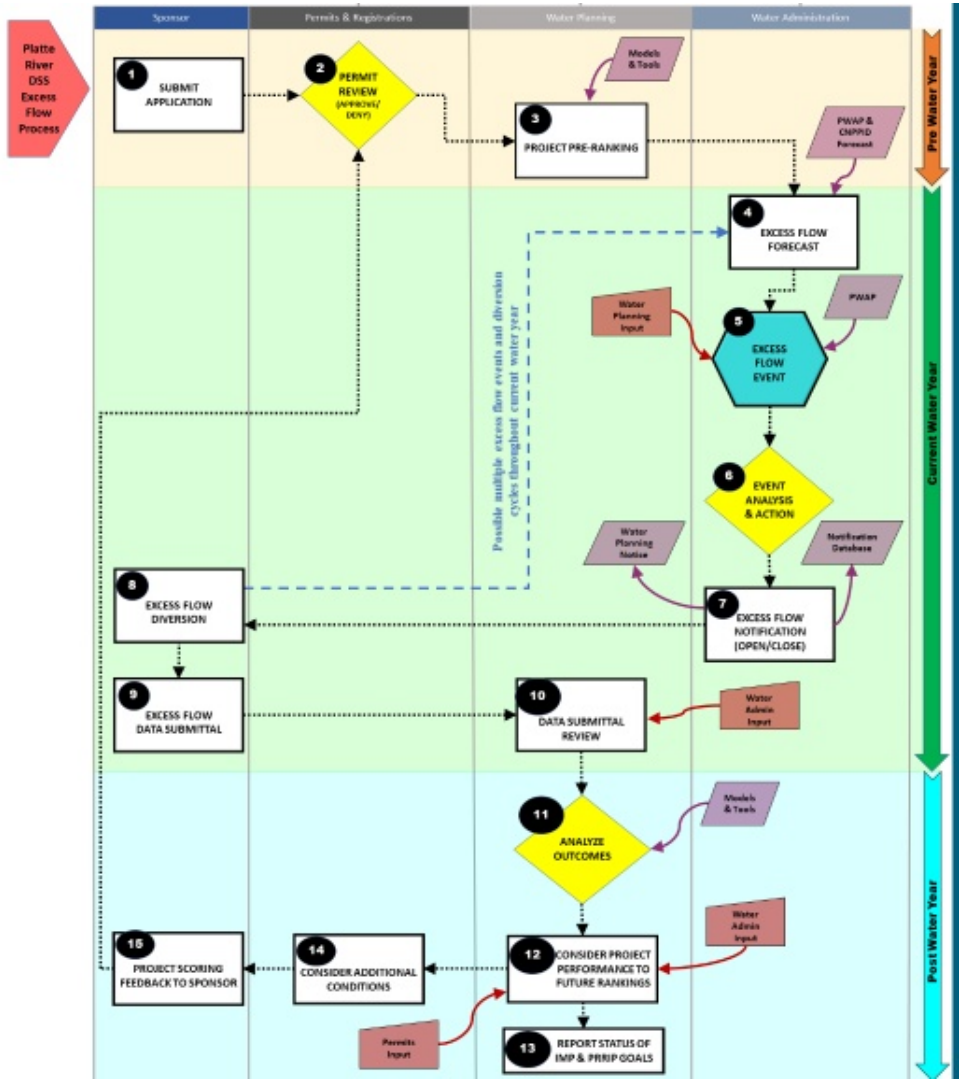
- *Utilized an intense Design Sprint approach to develop the process*
- *Determined annual actions, excess flow event actions and timing of the actions*
- *Identified responsibilities within the "swim lanes" of each NeDNR division or sponsor*

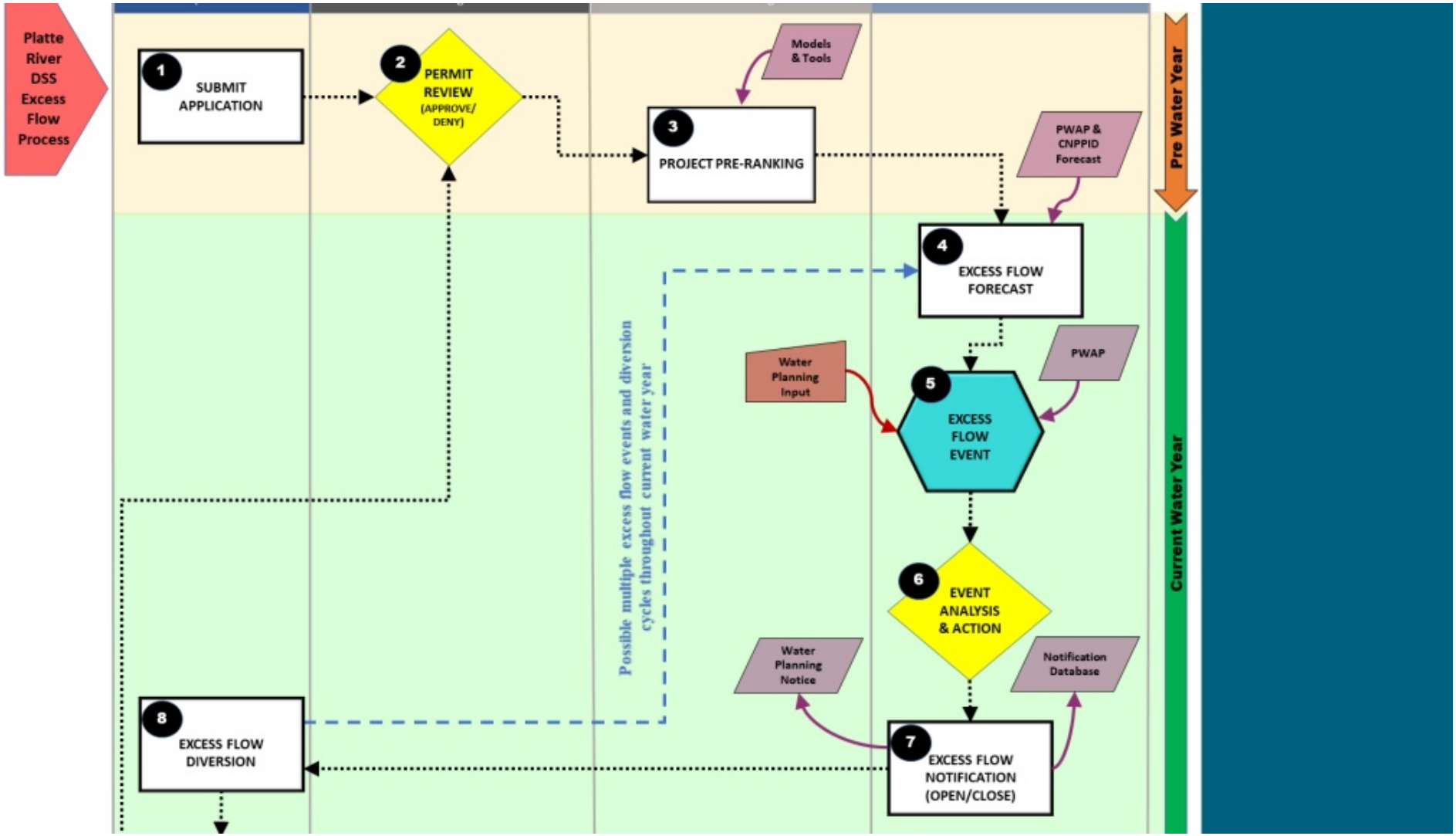


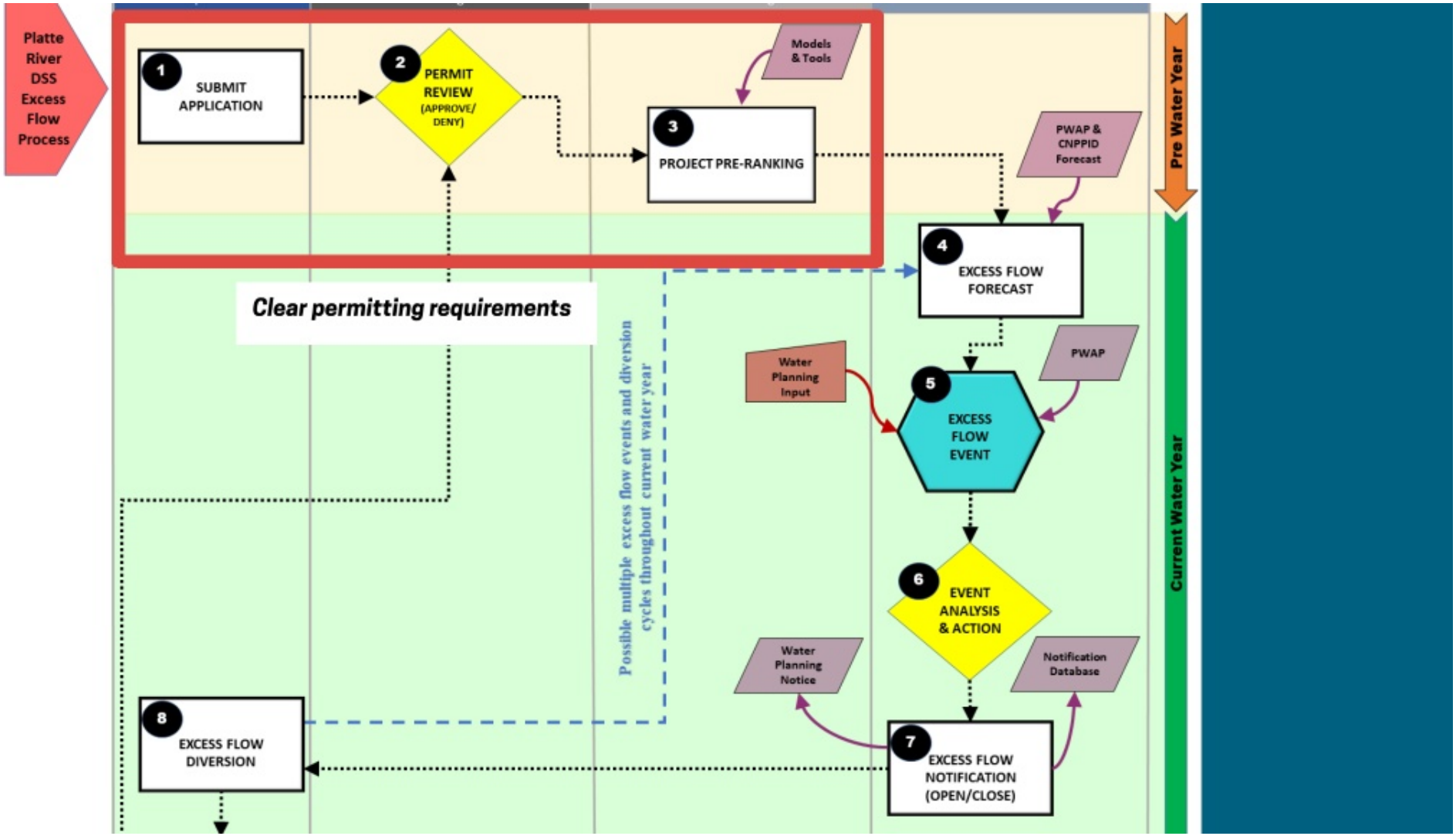

Key Strategy 1:
Clear Permitting and
Timely Administration

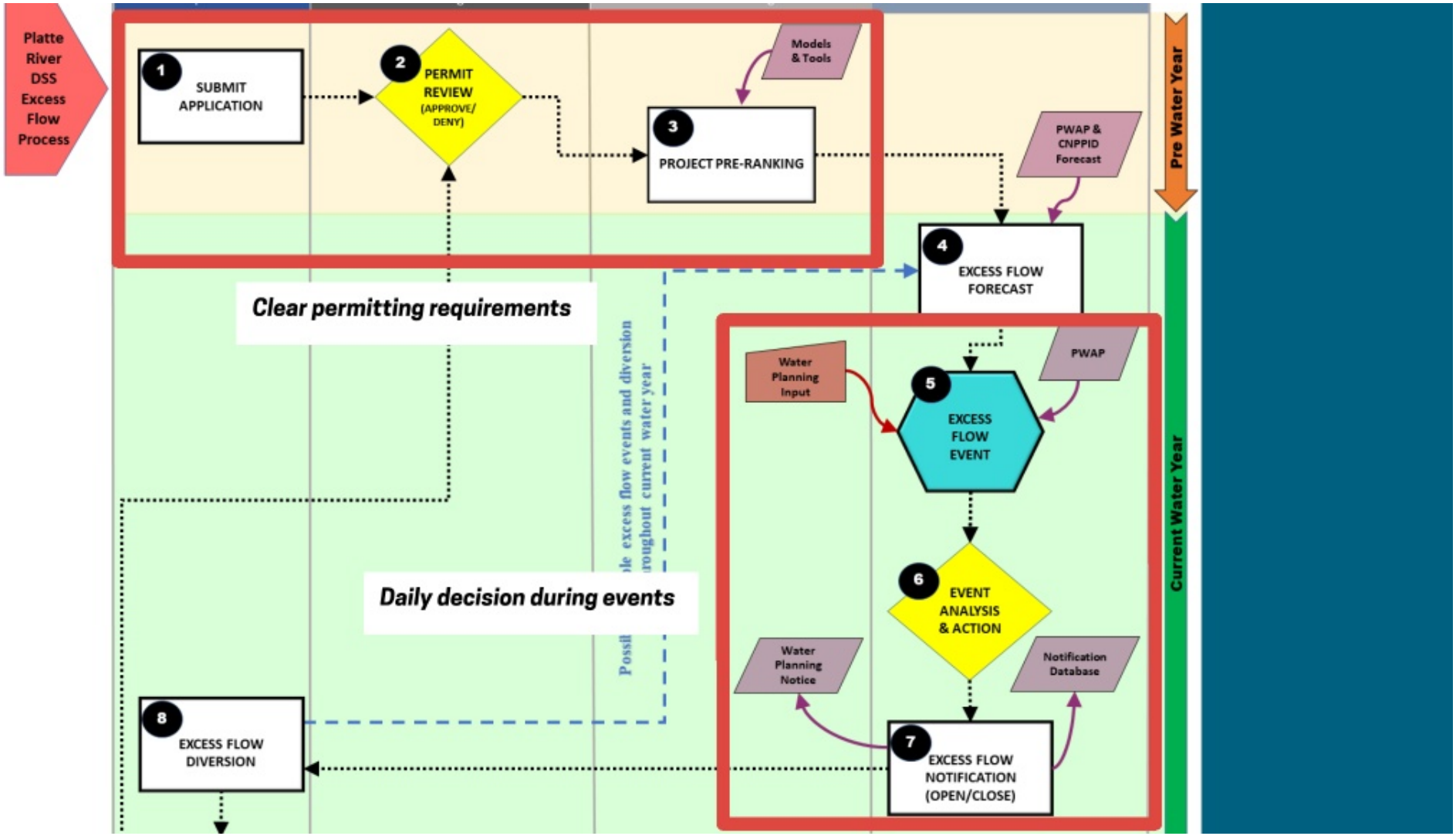
Key Strategy 1:
Clear Permitting and Timely Administration

- *Clear permitting requirements and expectations*
- *Administration decisions on a daily basis during an excess flow event*




Platte River DSS Excess Flow Process
1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
Possible multiple excess flow events and diversion cycles throughout current water year
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
8
EXCESS FLOW DIVERSION
Current Water Year

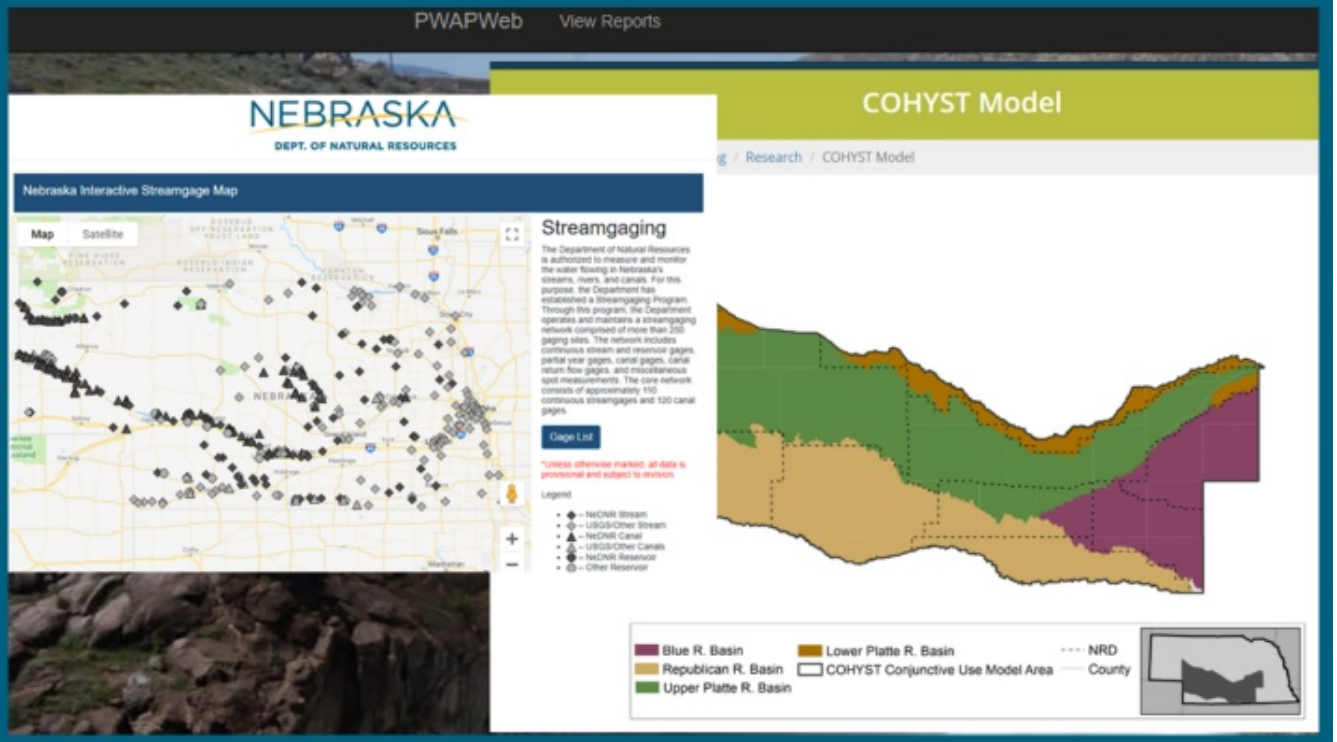

Platte River DSS Excess Flow Process
1 SUBMIT APPLICATION
2 PERMIT REVIEW (APPROVE/ DENY)
Models & Tools
3 PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
Clear permitting requirements
4 EXCESS FLOW FORECAST
Water Planning Input
PWAP
5 EXCESS FLOW EVENT
Possible multiple excess flow events and diversion cycles throughout current water year
6 EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7 EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
8 EXCESS FLOW DIVERSION
Current Water Year

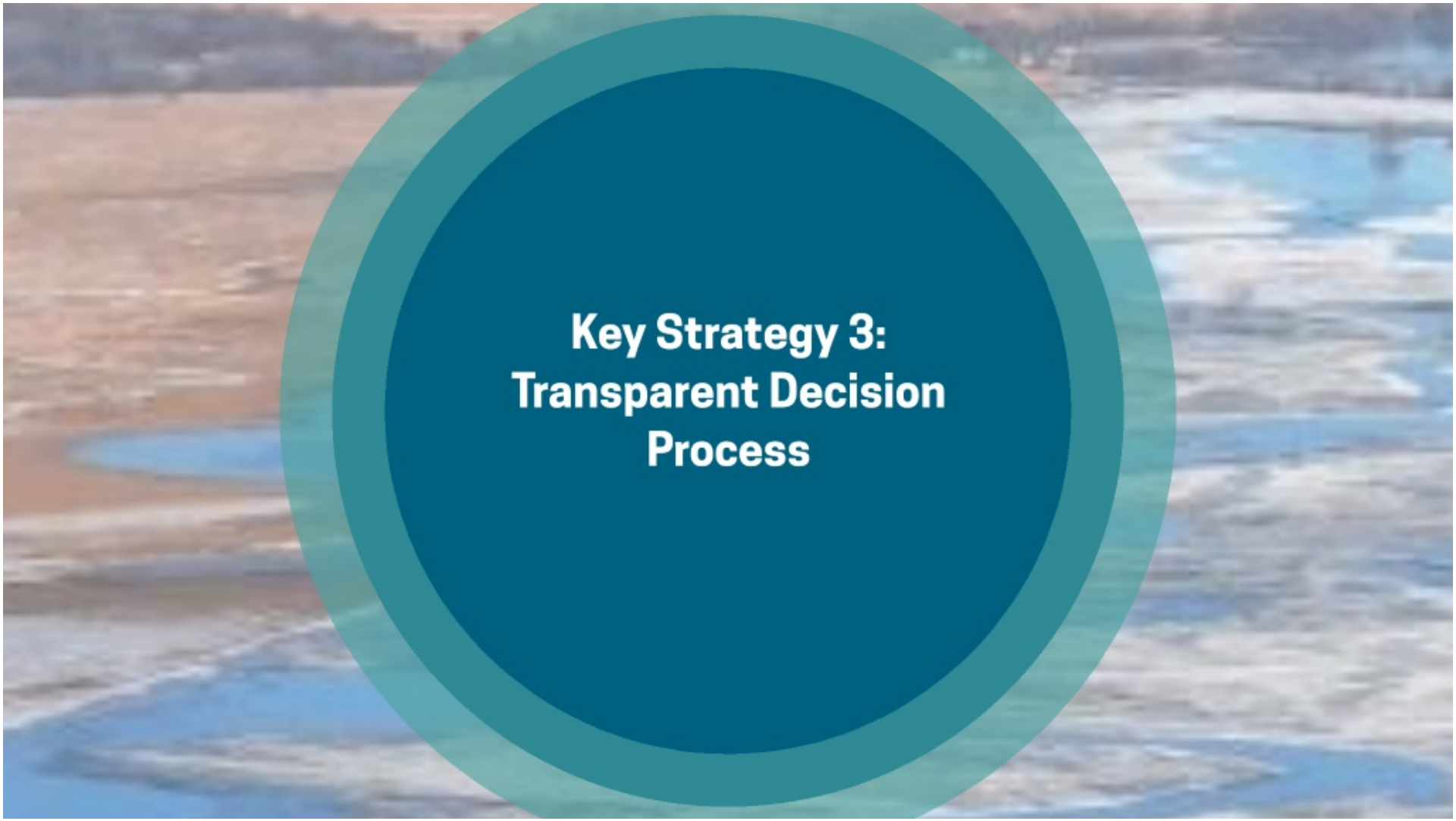

Platte River DSS Excess Flow Process
1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Clear permitting requirements
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
Current Water Year
Daily decision during events
8
EXCESS FLOW DIVERSION


Key Strategy 2:
Integration of
Existing Tools & Models

Key Strategy 2:
Integration of Existing Tools & Models

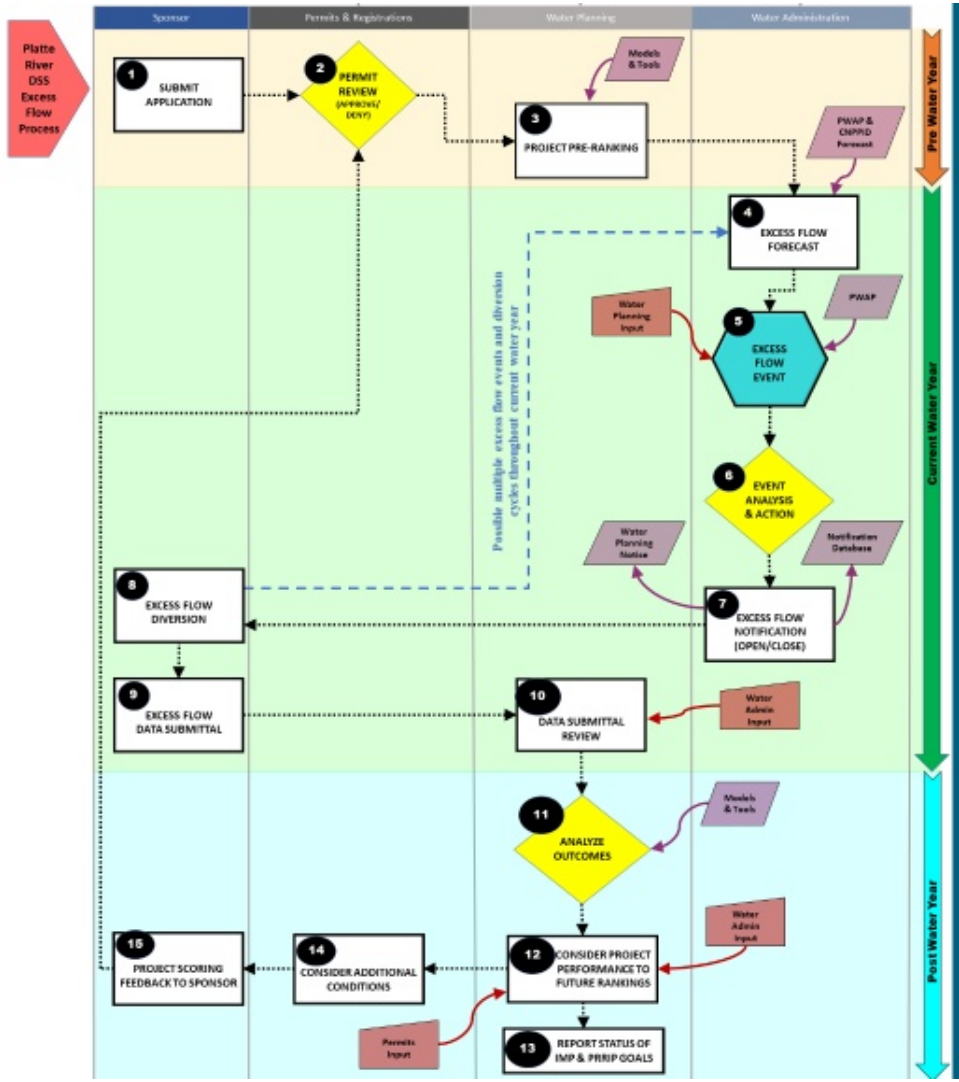
- *Efficiently connect multiple data sources through one platform*
- *Leverage existing data and models (no new models being developed)*
- *Fast access to key data at time of decision*

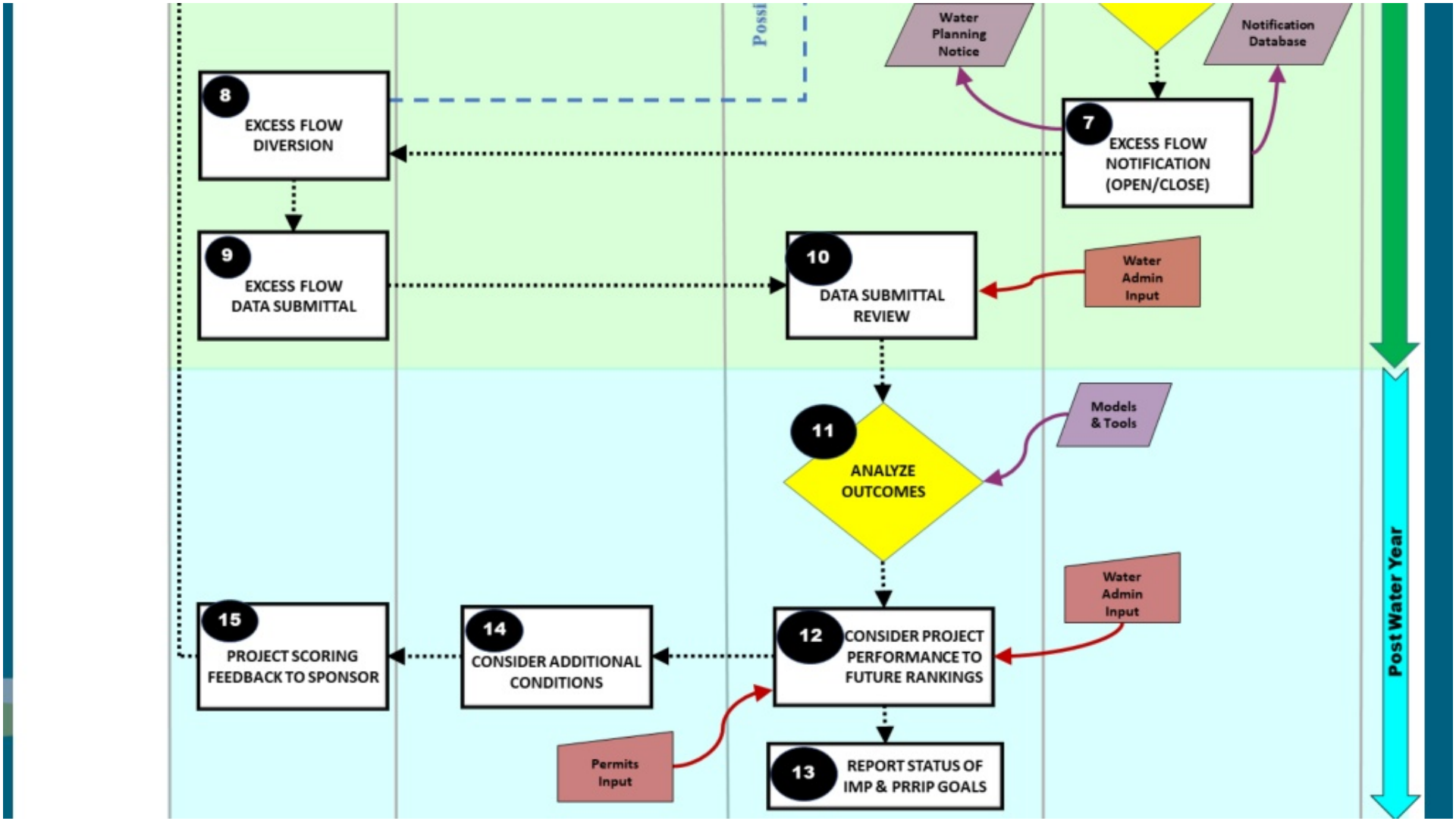


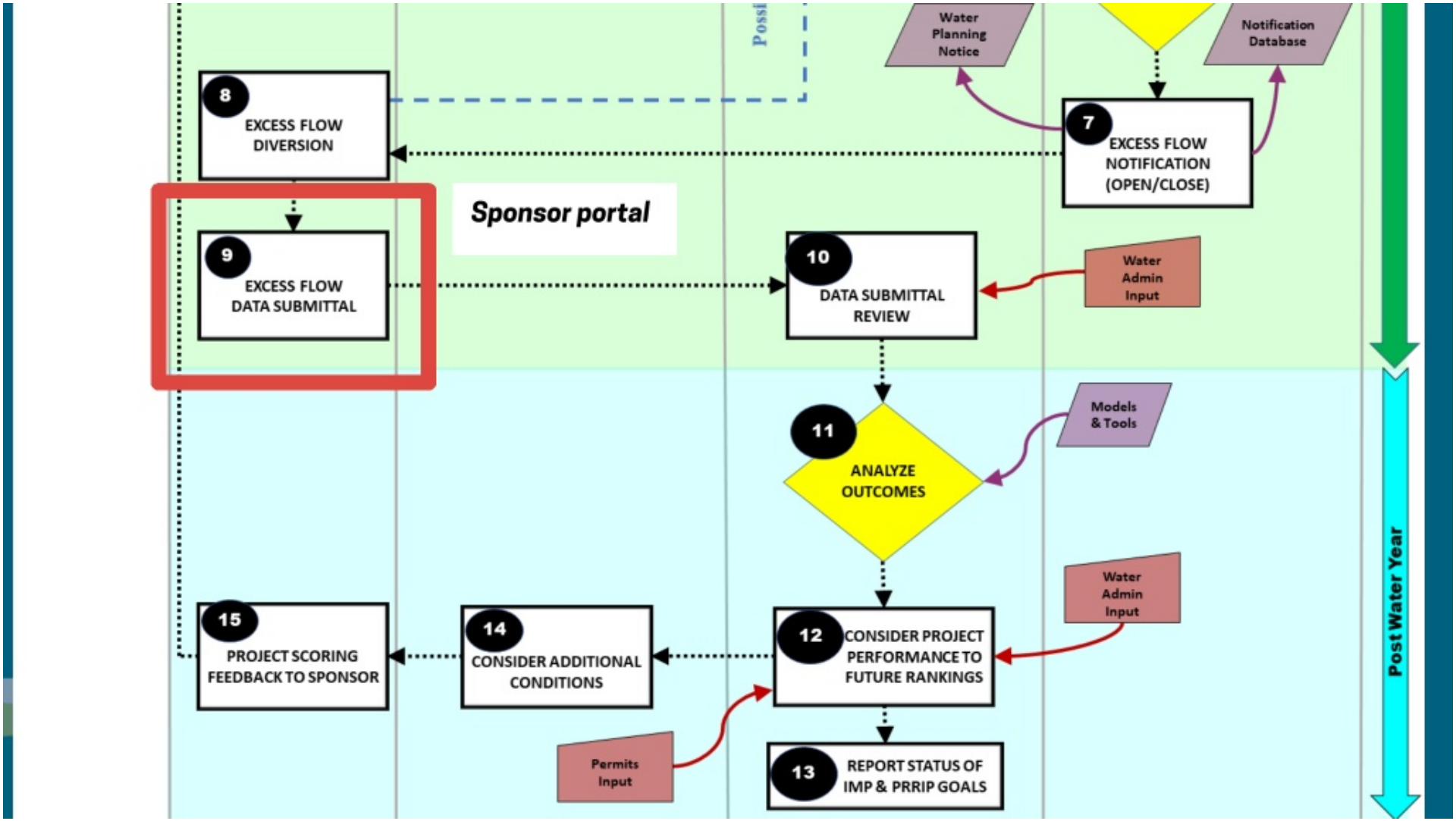

Key Strategy 3:
Transparent Decision
Process

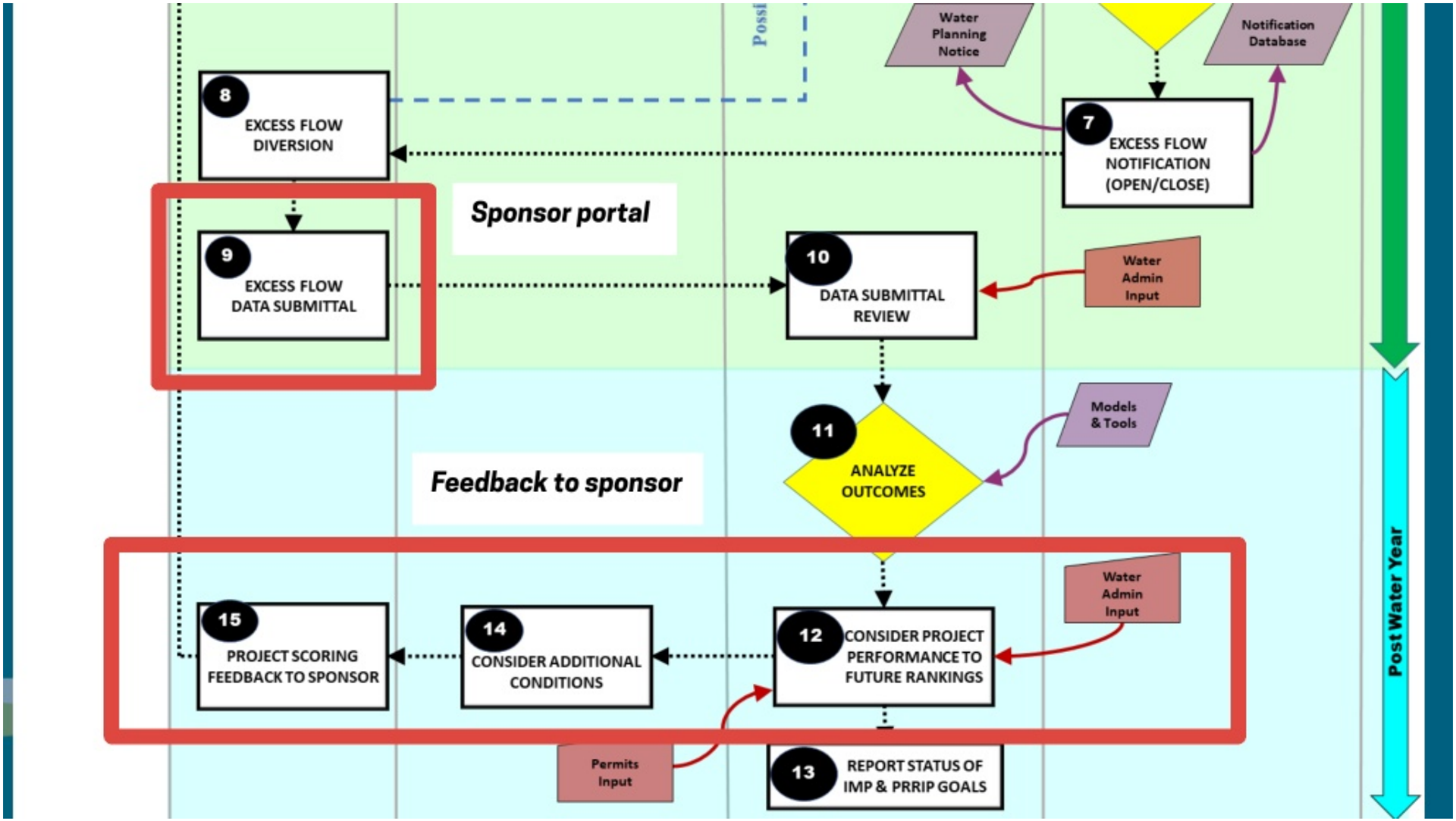
Key Strategy 3:
Transparent Decision Process

- *Create transparent guidelines for excess flow ranking*
- *Sponsor portals for permit applications and excess flow data submittal*
- *Feedback to sponsors on projects*




Water Planning Notice
Notification Database
8
EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
Water Admin Input
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
CONSIDER ADDITIONAL CONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS
Post Water Year

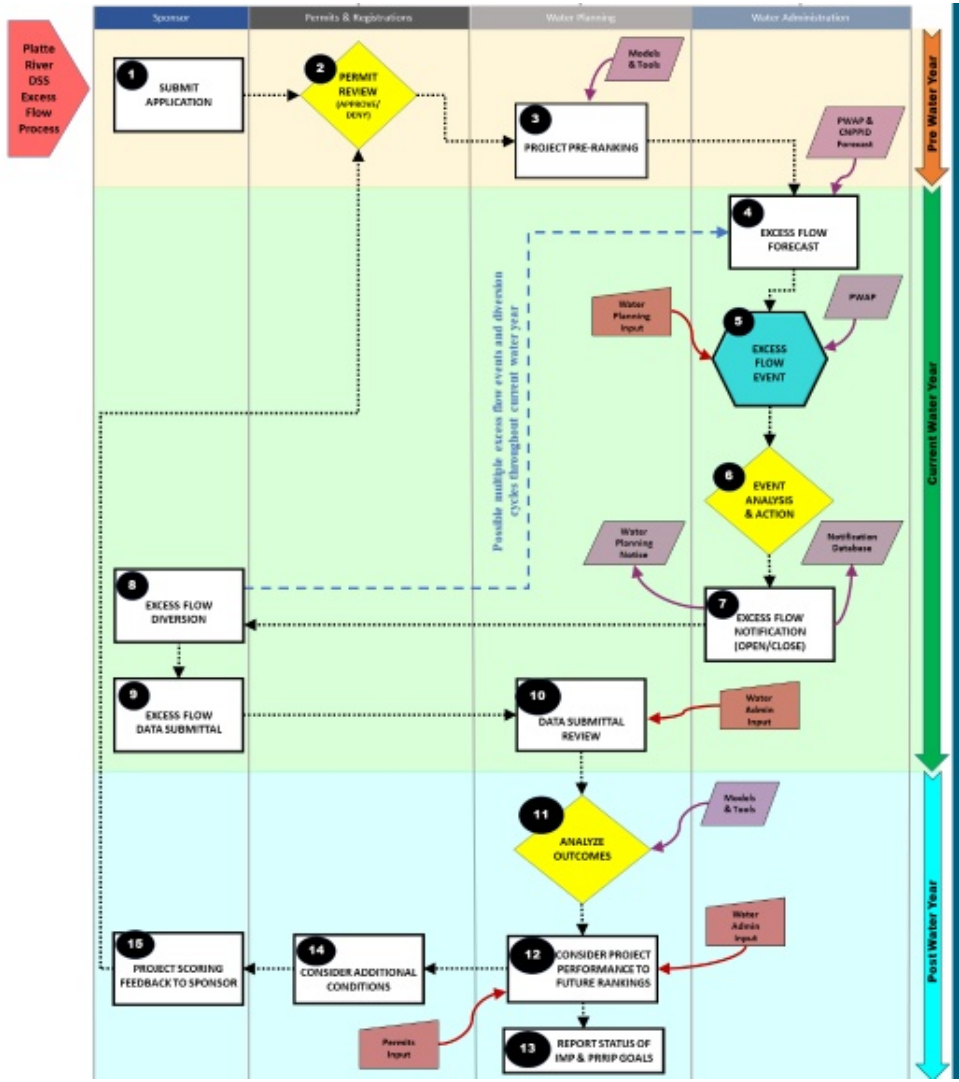

Water Planning Notice
Notification Database
8
EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
Sponsor portal
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
Post Water Year
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
CONSIDER ADDITIONAL CONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Water Admin Input
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS

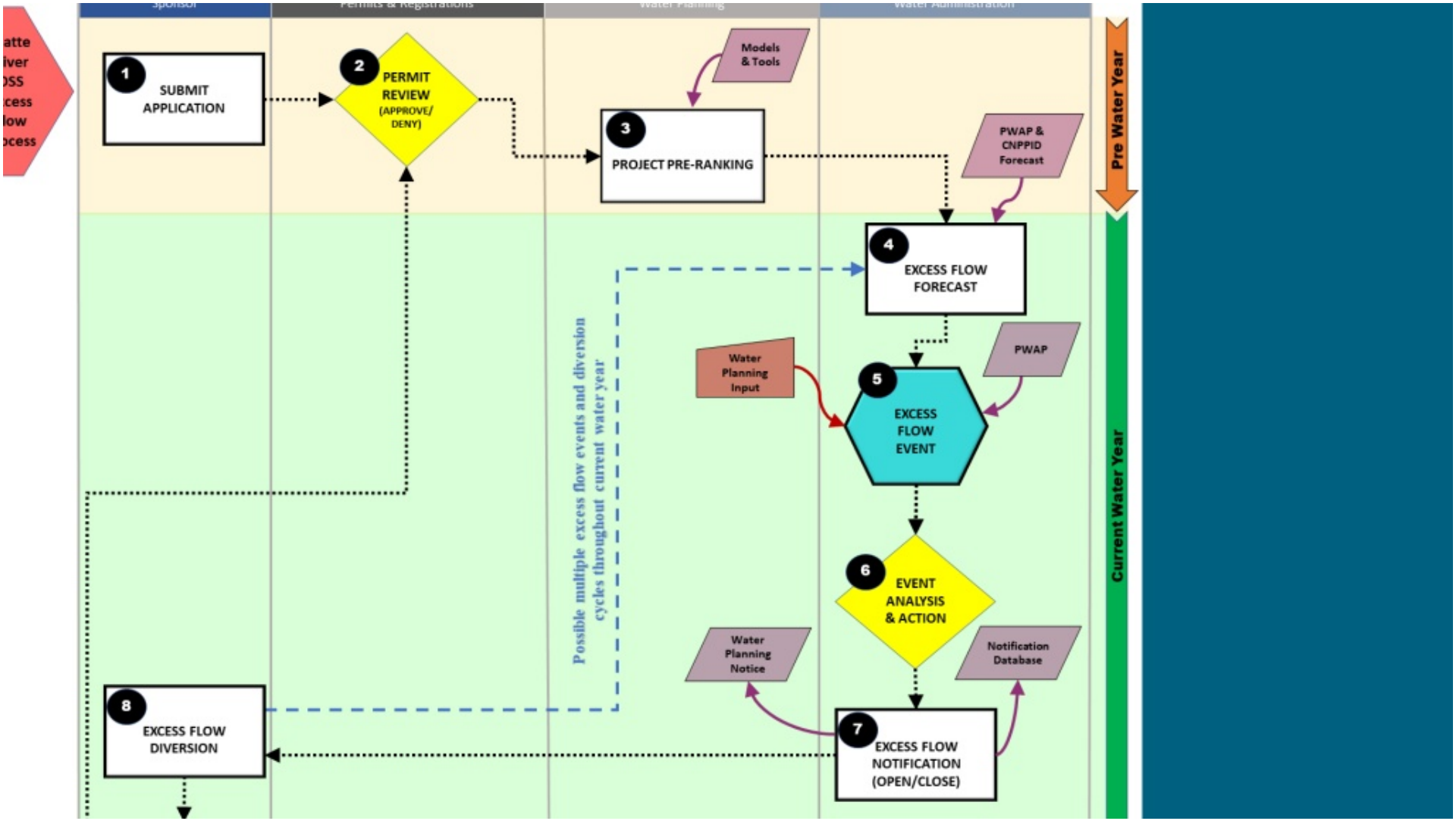

Water Planning Notice
Notification Database
8
EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
Sponsor portal
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
Feedback to sponsor
Post Water Year
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
CONSIDER ADDITIONAL CONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Water Admin Input
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS

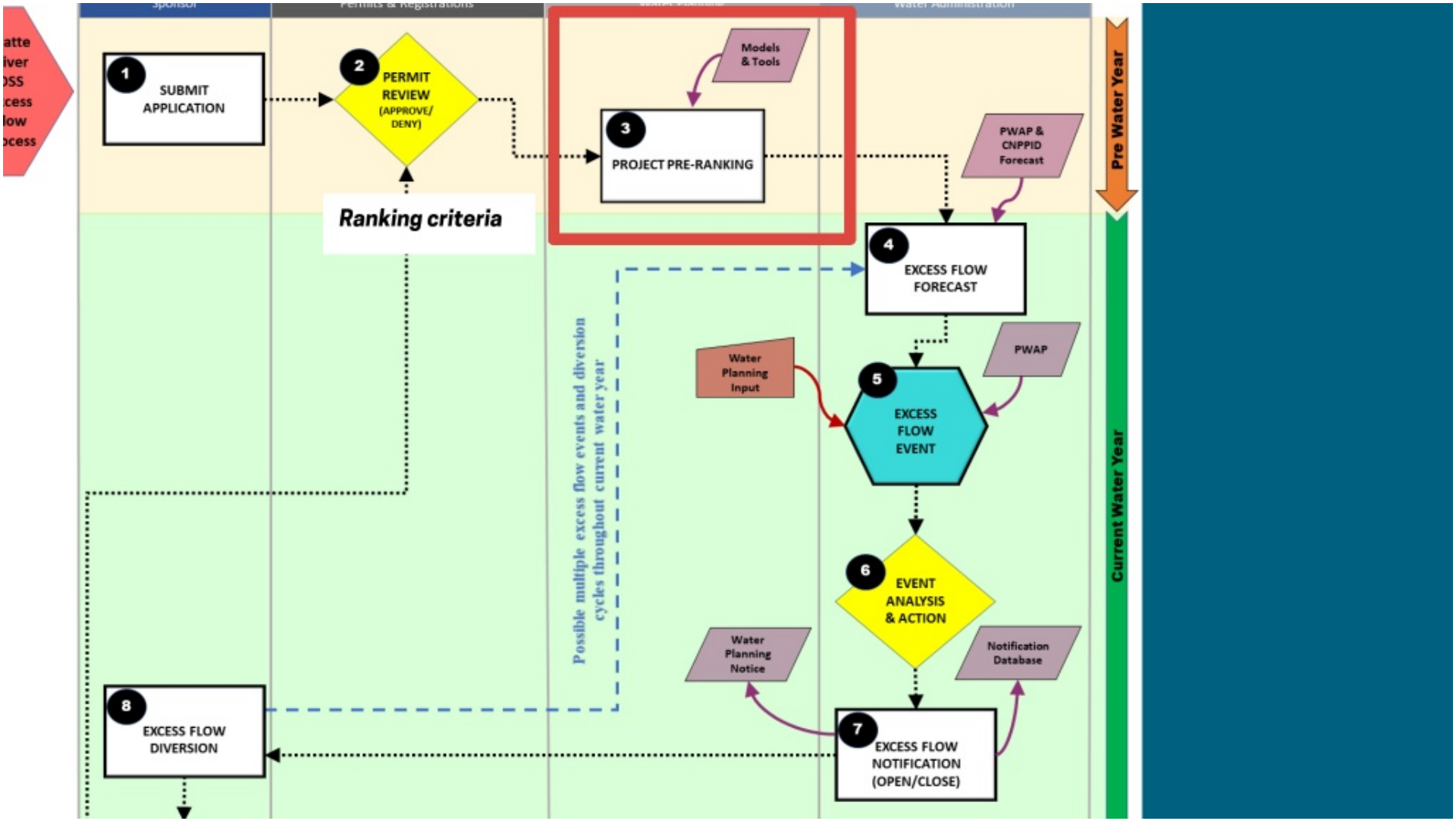

Key Strategy 4:
Ranking & Project
Selection

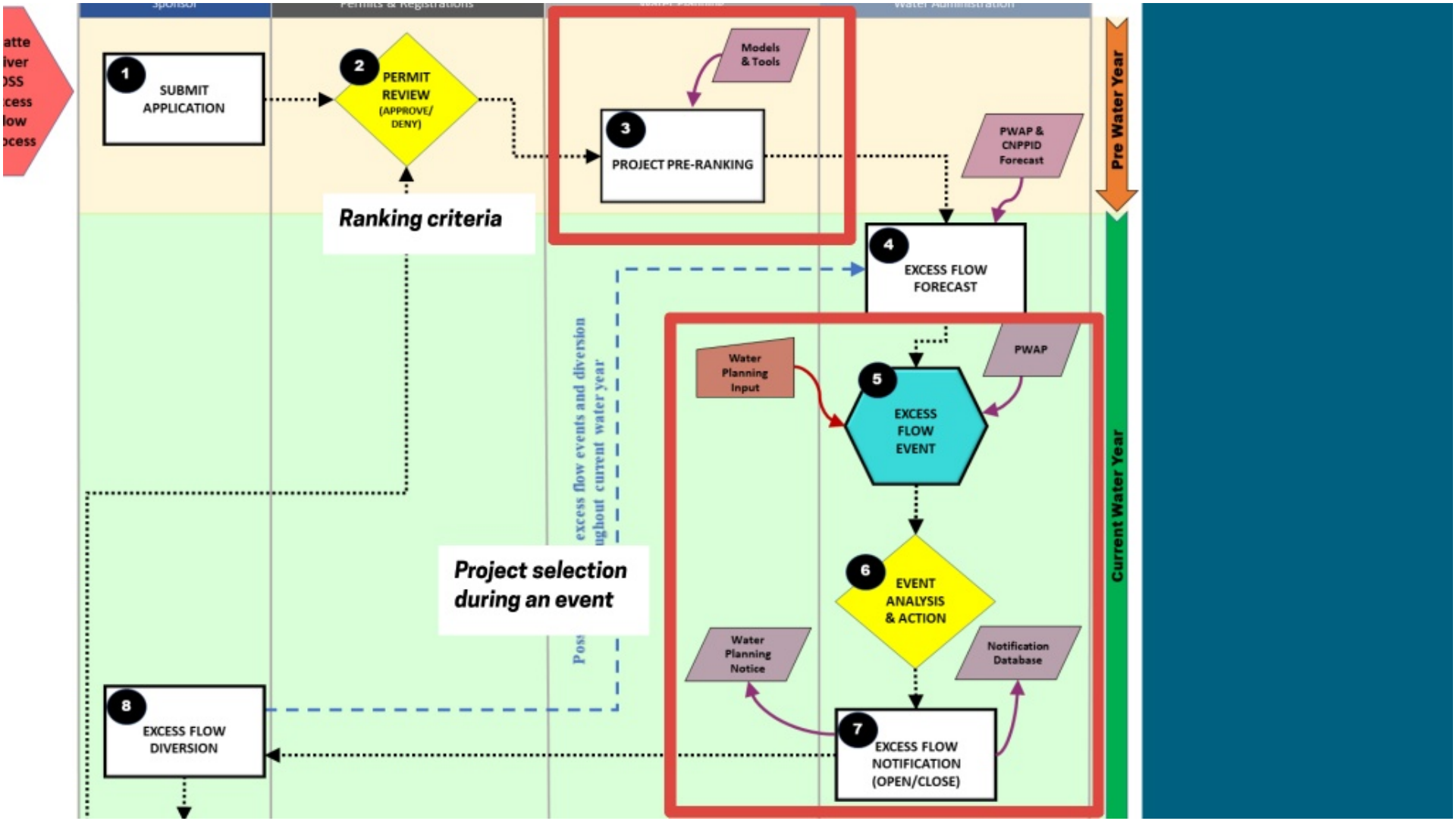
Key Strategy 4:
Ranking & Project Selection

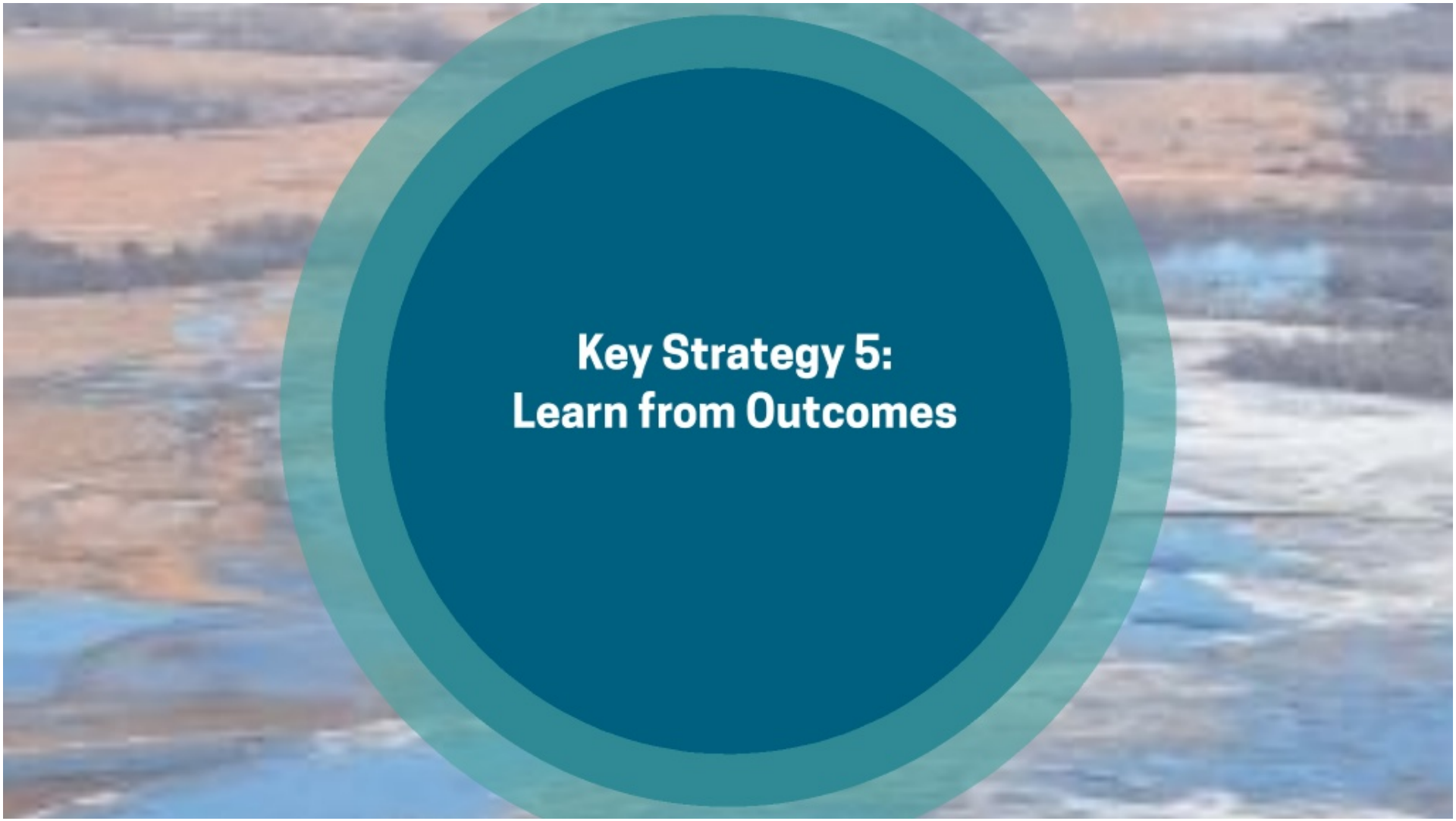
- *Develop criteria to evaluate and pre-rank effectiveness of projects to meet goals*
- *Select projects and take action during an excess flow event*




1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
3
PROJECT PRE-RANKING
Models & Tools
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
Possible multiple excess flow events and diversion cycles throughout current water year
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
8
EXCESS FLOW DIVERSION
Current Water Year

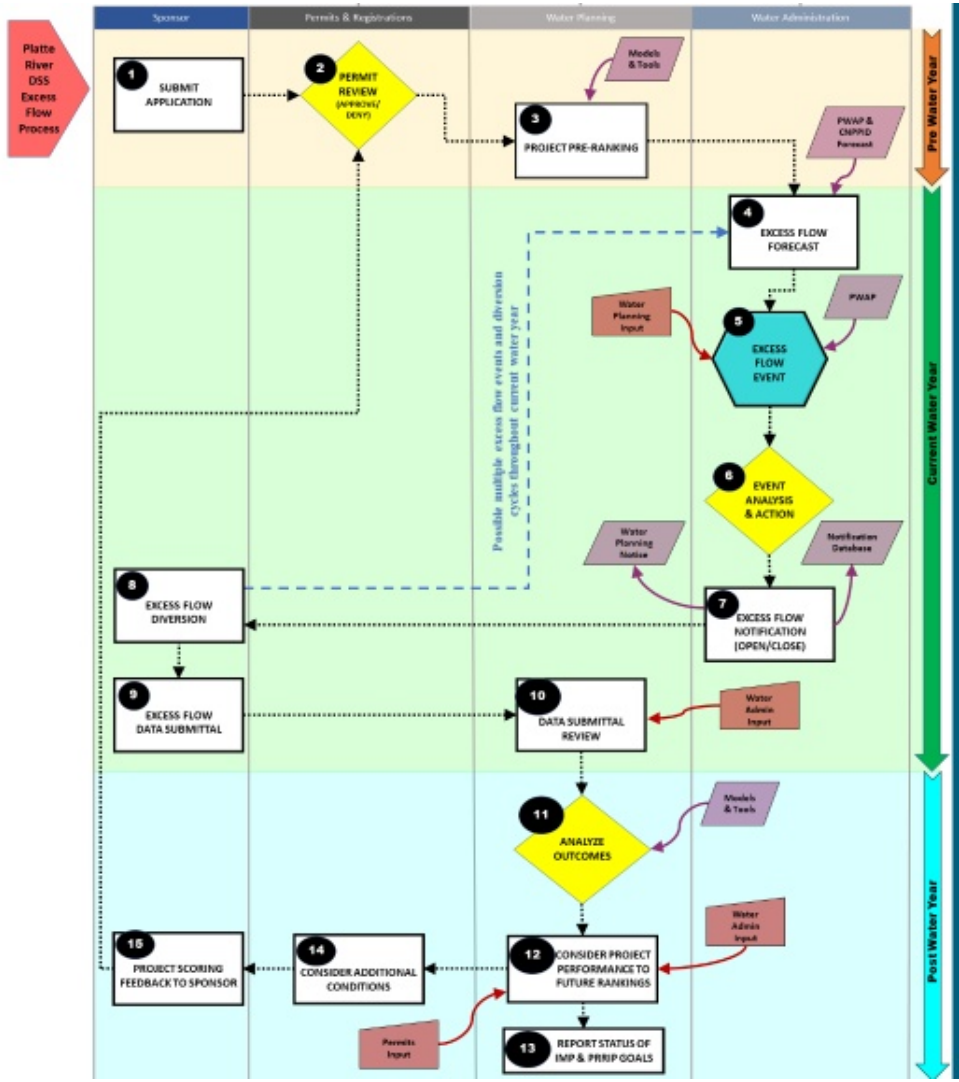

1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Ranking criteria
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
Possible multiple excess flow events and diversion cycles throughout current water year
Current Water Year
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
8
EXCESS FLOW DIVERSION

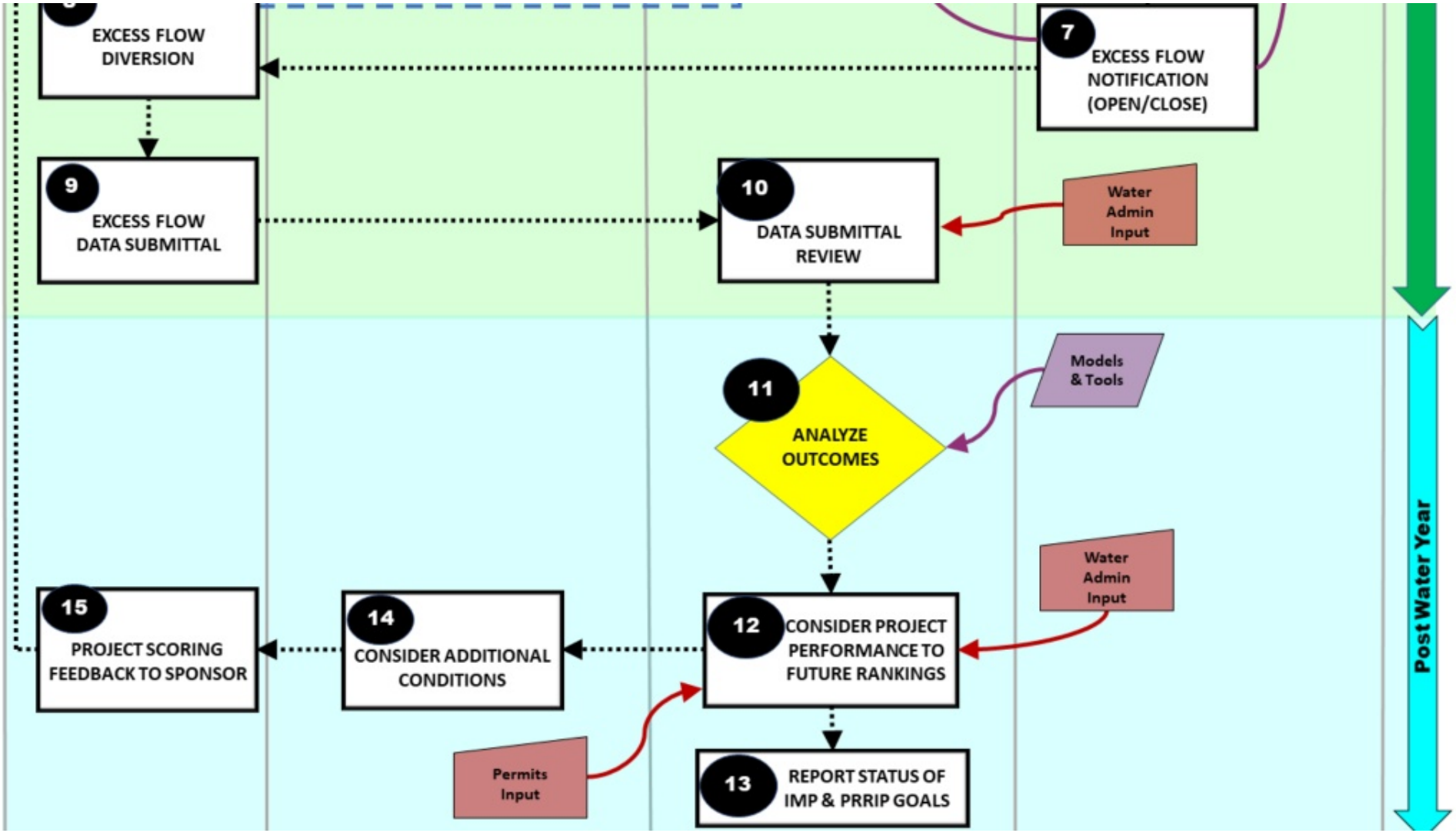

1
SUBMIT APPLICATION
2
PERMIT REVIEW (APPROVE/ DENY)
Ranking criteria
Models & Tools
3
PROJECT PRE-RANKING
PWAP & CNPPID Forecast
Pre Water Year
4
EXCESS FLOW FORECAST
Water Planning Input
PWAP
5
EXCESS FLOW EVENT
6
EVENT ANALYSIS & ACTION
Water Planning Notice
Notification Database
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
Current Water Year
Project selection during an event
8
EXCESS FLOW DIVERSION

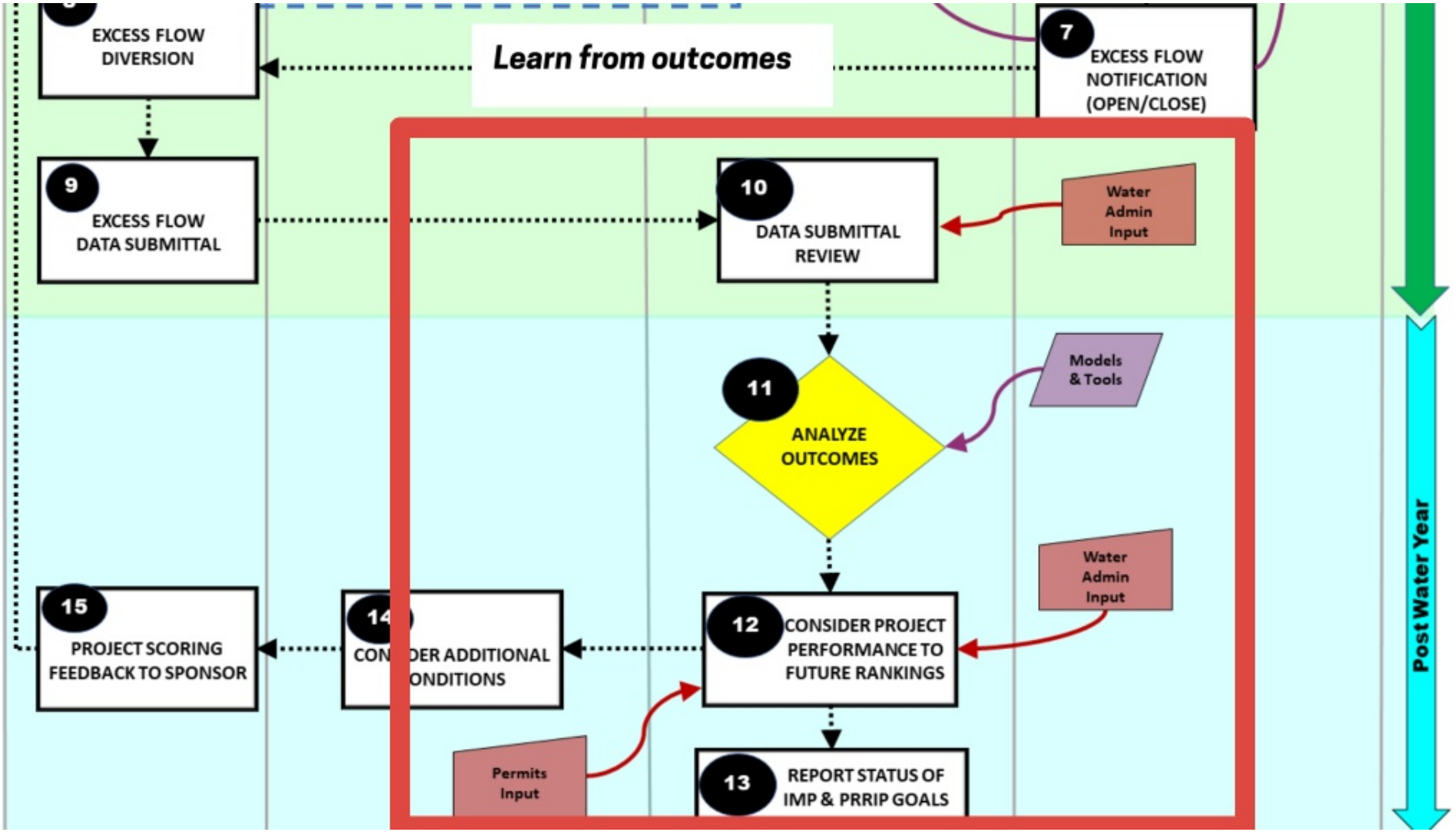

Key Strategy 5:
Learn from Outcomes

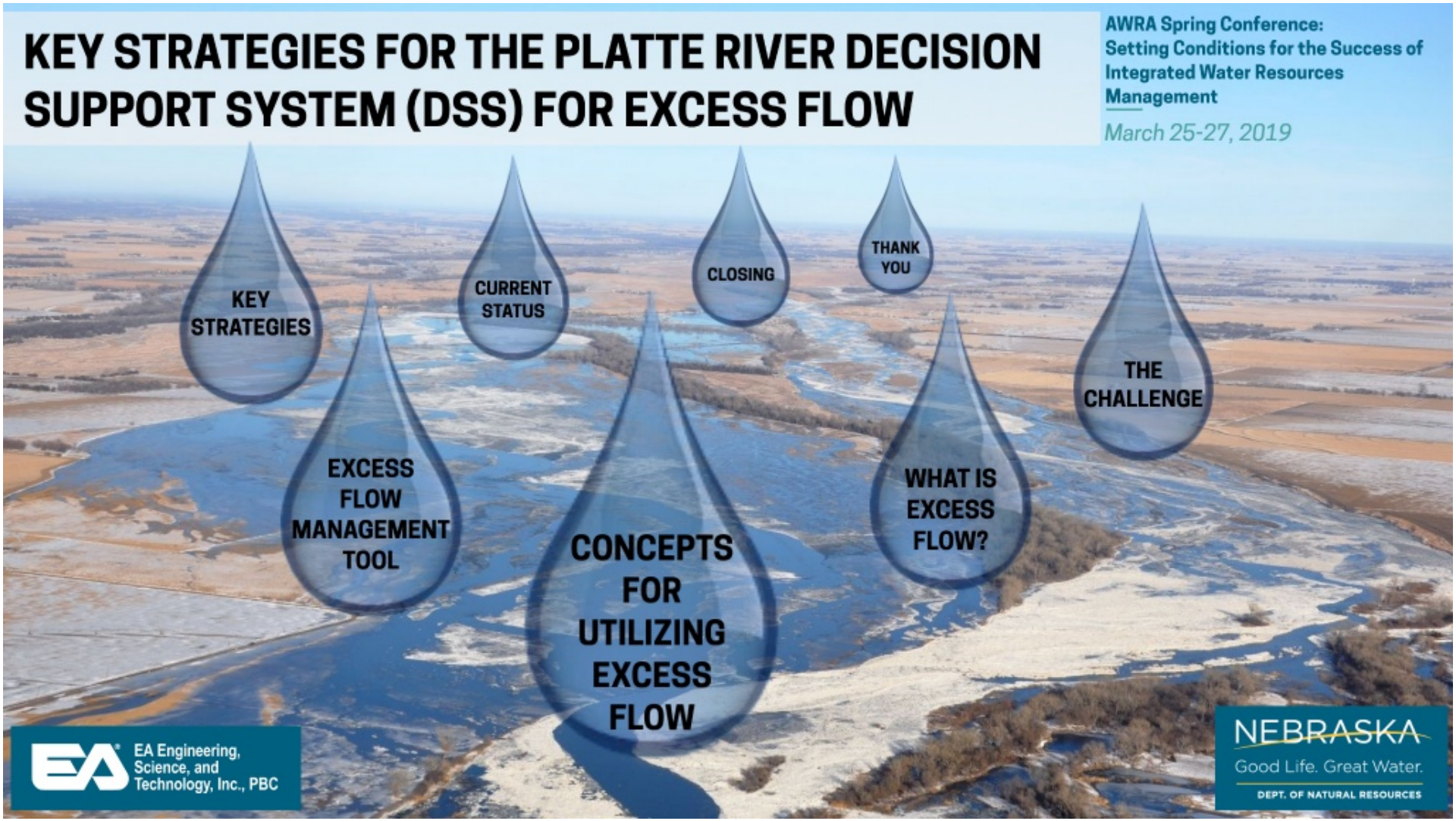
Key Strategy 5:
Learn from Outcomes

- *Provide tracking and reporting of benefits achieved through excess flow diversion*
- *Use past performance of projects in future ranking*



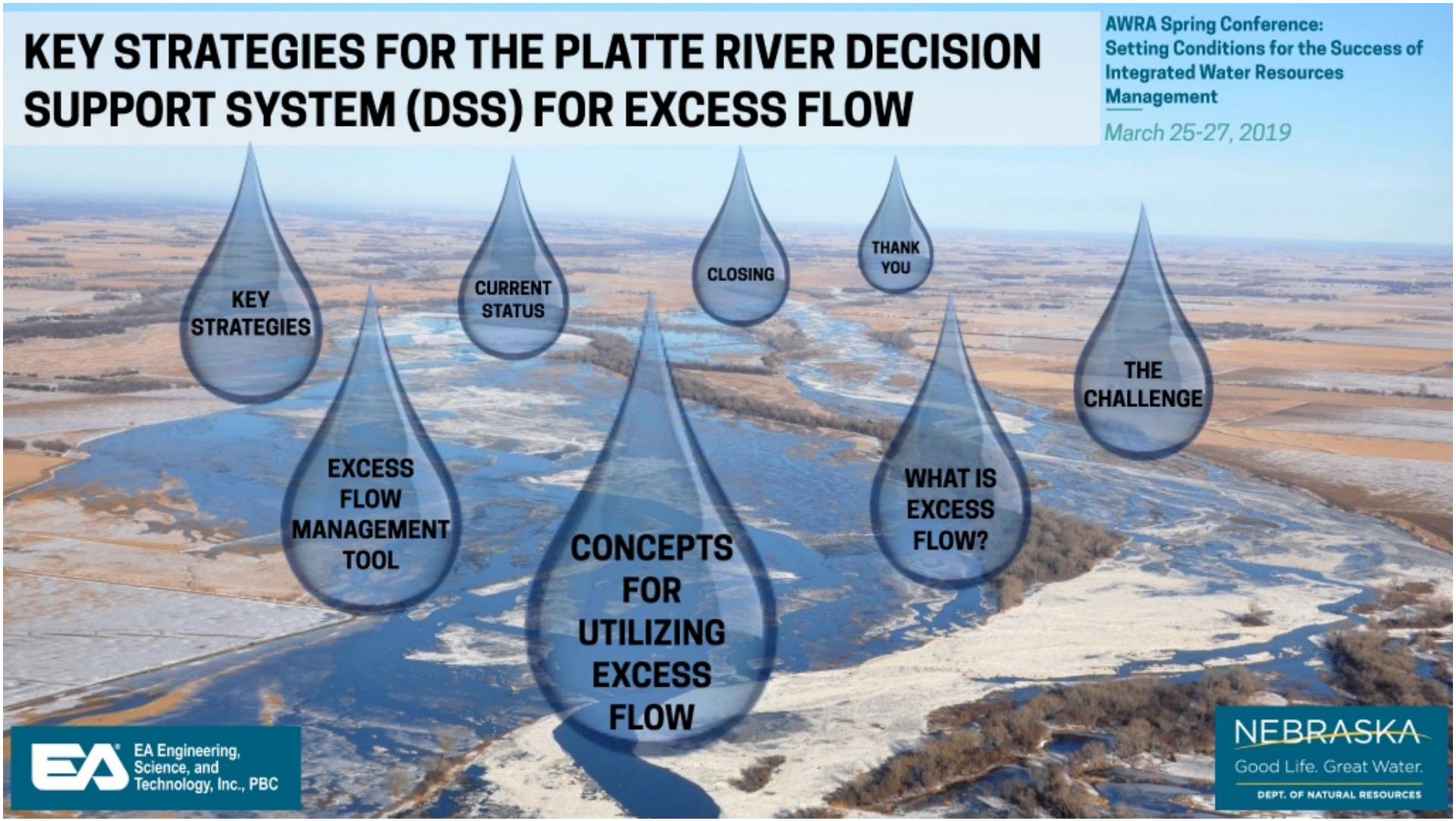

EXCESS FLOW DIVERSION
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
CONSIDER ADDITIONAL CONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Water Admin Input
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS
Post Water Year


EXCESS FLOW DIVERSION
Learn from outcomes
7
EXCESS FLOW NOTIFICATION (OPEN/CLOSE)
9
EXCESS FLOW DATA SUBMITTAL
10
DATA SUBMITTAL REVIEW
Water Admin Input
11
ANALYZE OUTCOMES
Models & Tools
Water Admin Input
15
PROJECT SCORING FEEDBACK TO SPONSOR
14
ONDITIONS
12
CONSIDER PROJECT PERFORMANCE TO FUTURE RANKINGS
Permits Input
13
REPORT STATUS OF IMP & PRRIP GOALS
Post Water Year


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

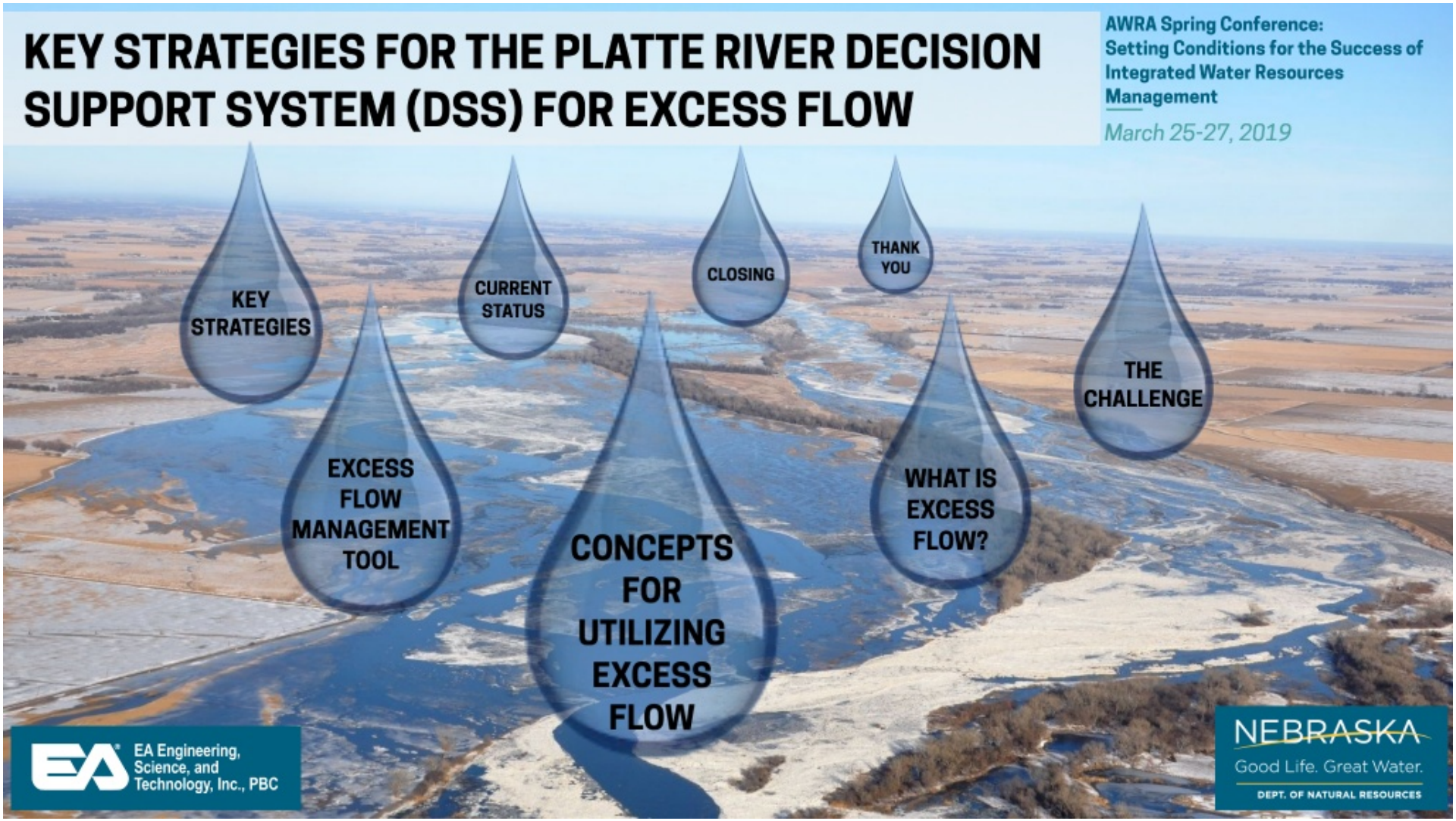
Current Status:

- *Phased approach to development*
- *Basic DSS platform to launch in late 2019*
- *Future phases will add and enhance features*
- *Platform expandability for future inclusion of other basins*
- *Utilizing Agile Development approach and Design Sprints*


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

Concluding Points:

- *Recognize high demand for last drops of "excess" water*
- *Refinement was needed for determining what is "excess"*
- *Better tracking and reporting of events*
- *Transparency*


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

Thank You

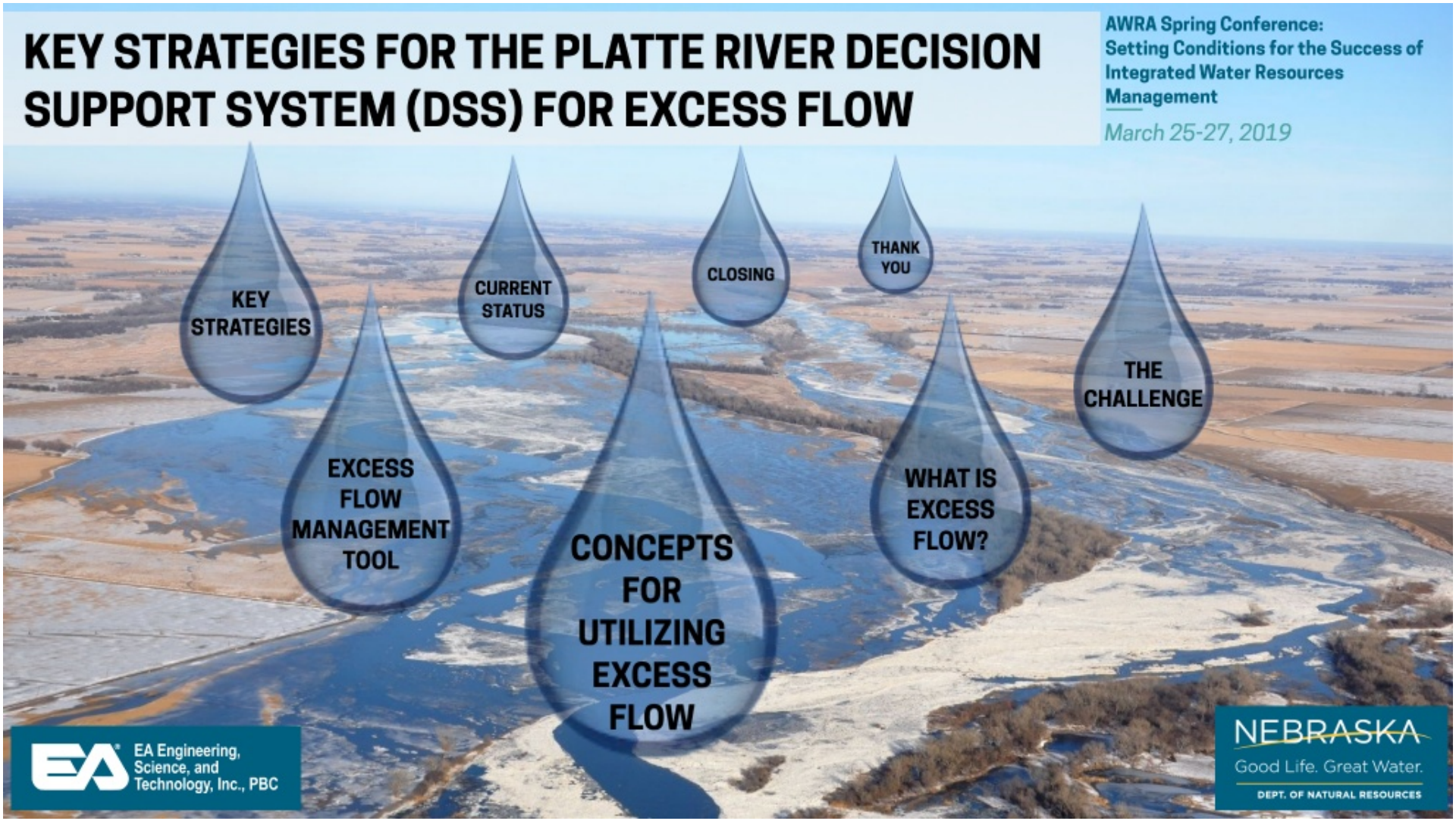
Presenter: Jennifer Schellpeper
Nebraska Department of Natural Resources
Water Planning Division Manager
jennifer.schellpeper@nebraska.gov

Co-presenter: Dale Schlautman, PE
EA Engineering Science & Technology, Inc., PBC
dschlautman@eaest.com

NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES

EA Engineering, Science, and Technology, Inc., PBC

dnr.nebraska.gov


KEY STRATEGIES FOR THE PLATTE RIVER DECISION SUPPORT SYSTEM (DSS) FOR EXCESS FLOW
AWRA Spring Conference:
Setting Conditions for the Success of Integrated Water Resources Management
March 25-27, 2019
KEY STRATEGIES
CURRENT STATUS
CLOSING
THANK YOU
THE CHALLENGE
EXCESS FLOW MANAGEMENT TOOL
CONCEPTS FOR UTILIZING EXCESS FLOW
WHAT IS EXCESS FLOW?
EA Engineering, Science, and Technology, Inc., PBC
NEBRASKA
Good Life. Great Water.
DEPT. OF NATURAL RESOURCES