Integrated Water Management: Nebraska's Future

Association of Western State Engineers
Spring Workshop
Nebraska City, NE
May 26, 2011
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Nebraska Department of Natural Resources

Overview

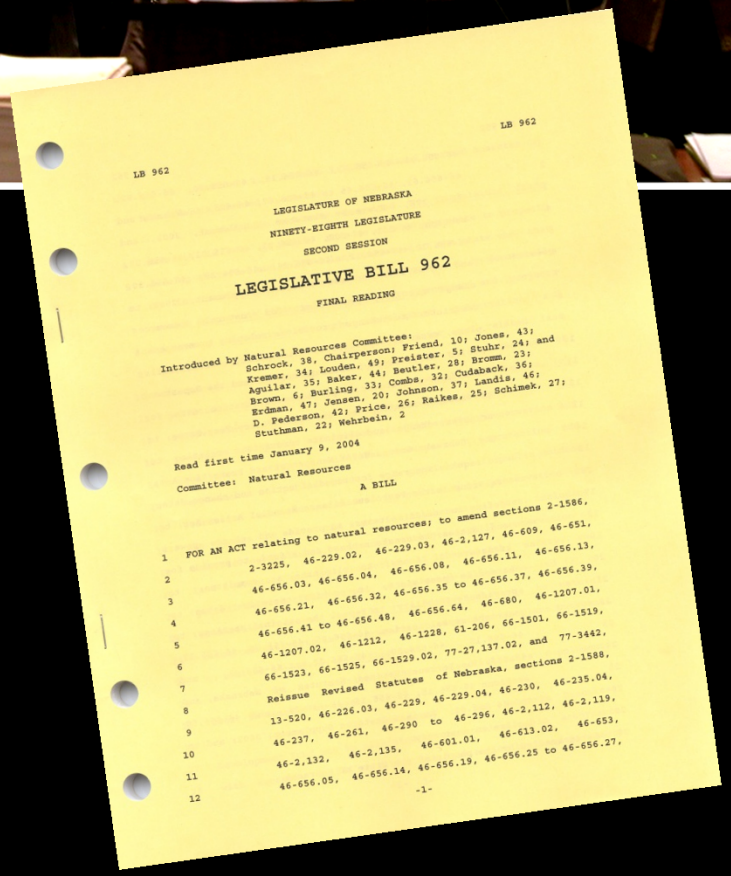
- Overview of Integrated Management Planning in Nebraska
- The Integrated Management Planning Process
- Major Basin Activities

Past Nebraska Water Management & Planning

- Non-systematic approach
- Surface-groundwater managed separately
- Changed as new data, technologies, & research became available
- “Incidental” integrated management

Current Nebraska Water Planning: Integrated Water Management

- Jointly manage surface and groundwater resources
- Pulls together multiple hydrologic concepts & tools (budgets, models)
- Basin-wide, systematic approach
- Work with NRDs within the basin
- Progressed from reactive learning to pro-active implementation



LB 962

LEGISLATURE OF NEBRASKA
NINETY-EIGHTH LEGISLATURE
SECOND SESSION

LEGISLATIVE BILL 962

FINAL READING

Introduced by Natural Resources Committee:
Schrock, 38, Chairperson; Friend, 10; Jones, 43;
Kremer, 34; Louden, 49; Preister, 5; Stuhr, 24; and
Aguilar, 35; Baker, 44; Beutler, 28; Bromm, 23;
Brown, 6; Burling, 33; Combs, 32; Cudaback, 36;
Erdman, 47; Jensen, 20; Johnson, 37; Landis, 46;
D. Pederson, 42; Price, 26; Raikes, 25; Schimek, 27;
Stuthman, 22; Wehrbein, 2

Read first time January 9, 2004

Committee: Natural Resources

A BILL

FOR AN ACT relating to natural resources; to amend sections 2-1586, 2-3225, 46-229.02, 46-229.03, 46-2,127, 46-609, 46-651, 46-656.03, 46-656.04, 46-656.08, 46-656.11, 46-656.13, 46-656.21, 46-656.32, 46-656.35 to 46-656.37, 46-656.39, 46-656.41 to 46-656.48, 46-656.64, 46-680, 46-1207.01, 46-1207.02, 46-1212, 46-1228, 61-206, 66-1501, 66-1519, 66-1523, 66-1525, 66-1529.02, 77-27,137.02, and 77-3442, Reissue Revised Statutes of Nebraska, sections 2-1588, 13-520, 46-226.03, 46-229, 46-229.04, 46-230, 46-235.04, 46-237, 46-261, 46-290 to 46-296, 46-2,112, 46-2,119, 46-2,132, 46-2,135, 46-601.01, 46-613.02, 46-653, 46-656.05, 46-656.14, 46-656.19, 46-656.25 to 46-656.27,

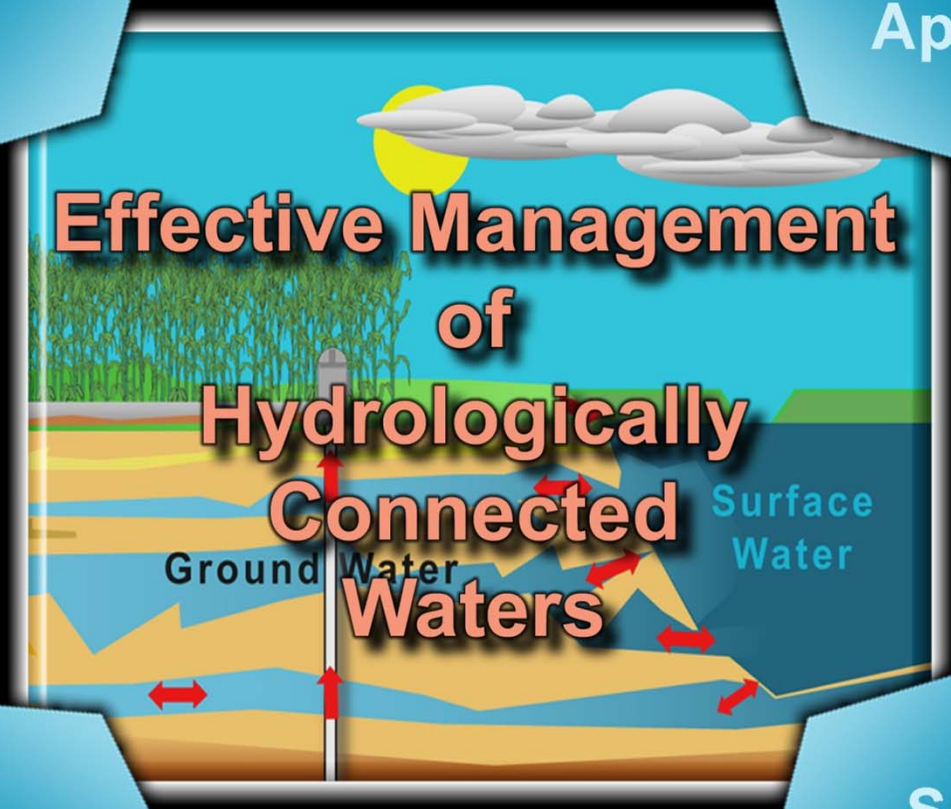
-1-

LB 962

was signed by Governor Johanns April 15, 2004

Groundwater Correlative Rights

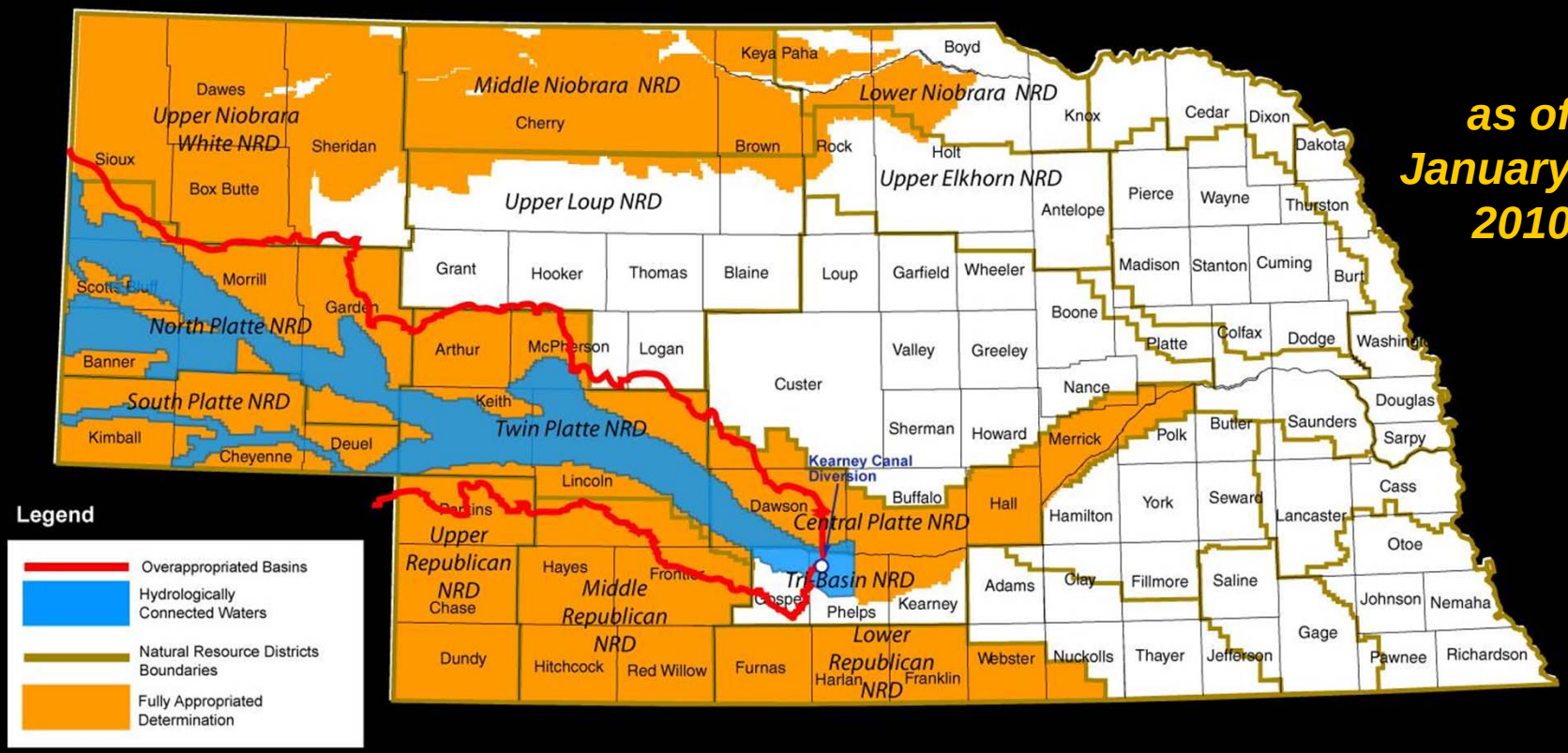
Surface Water Prior Appropriations



Groundwater Regulated by NRDs

Surface Water Regulated by DNR

Fully and Overappropriated Areas

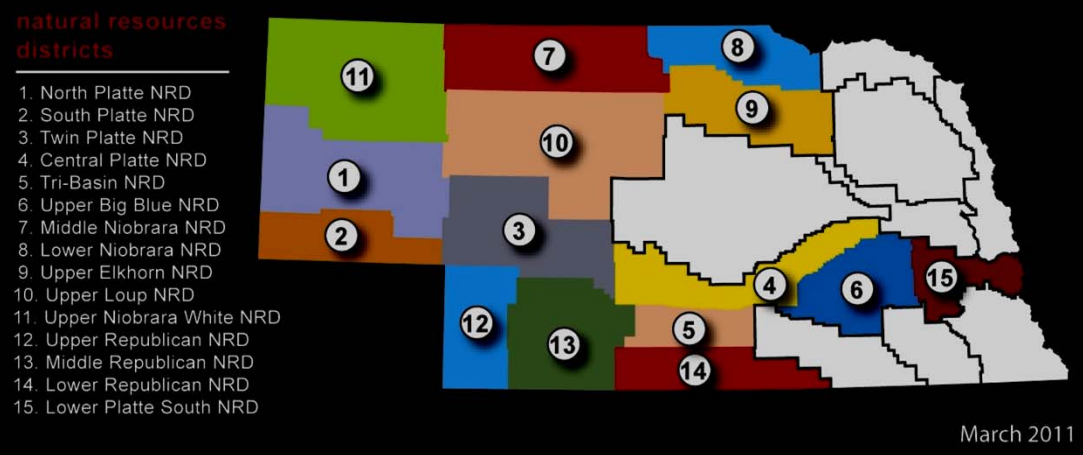


as of January 2010

‘FAB’ Report

- Annual Evaluation of Availability of Hydrologically Connected Water Supplies
- Evaluates the long-term availability of surface water supplies and hydrologically connected groundwater supplies of areas determined to be fully or overappropriated
- Required by *Neb. Rev. Stat.* §˚46-713 of the Ground Water Management and Protection Act

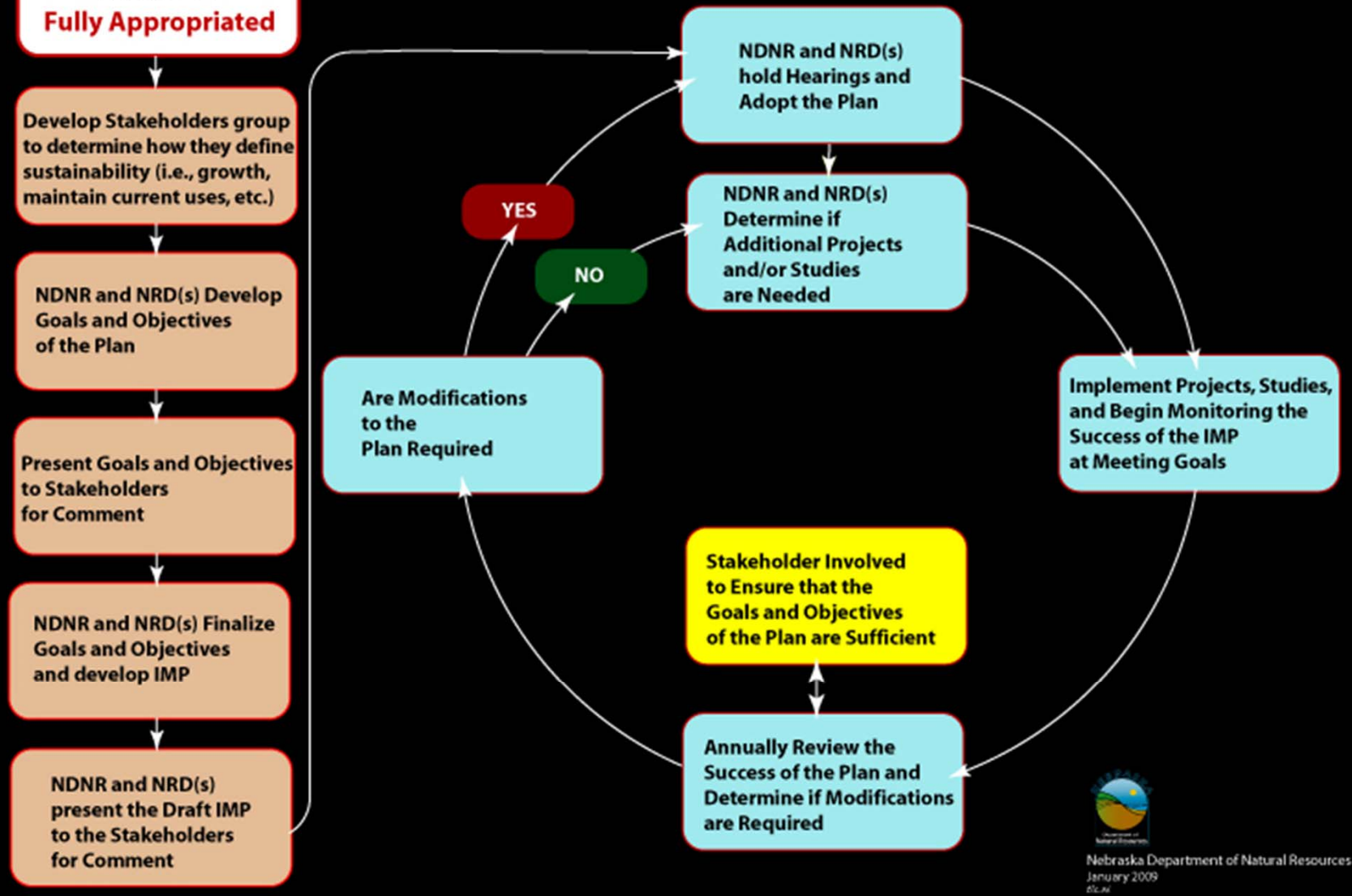
Status of Integrated Management Plans



15 Natural Resources Districts

- Ten natural resources districts have completed IMPs
- Four natural resources districts are in the process of developing IMPs
- One natural resources district is in the process of developing a voluntary IMP

Integrated Management Process



Nebraska Department of Natural Resources
January 2009

Integrated Water Management

- What is it?
- Why is it important?
- How can it be used in water management & planning?
- Adaptive Management
- How is Nebraska using this approach?

What is Integrated Management?

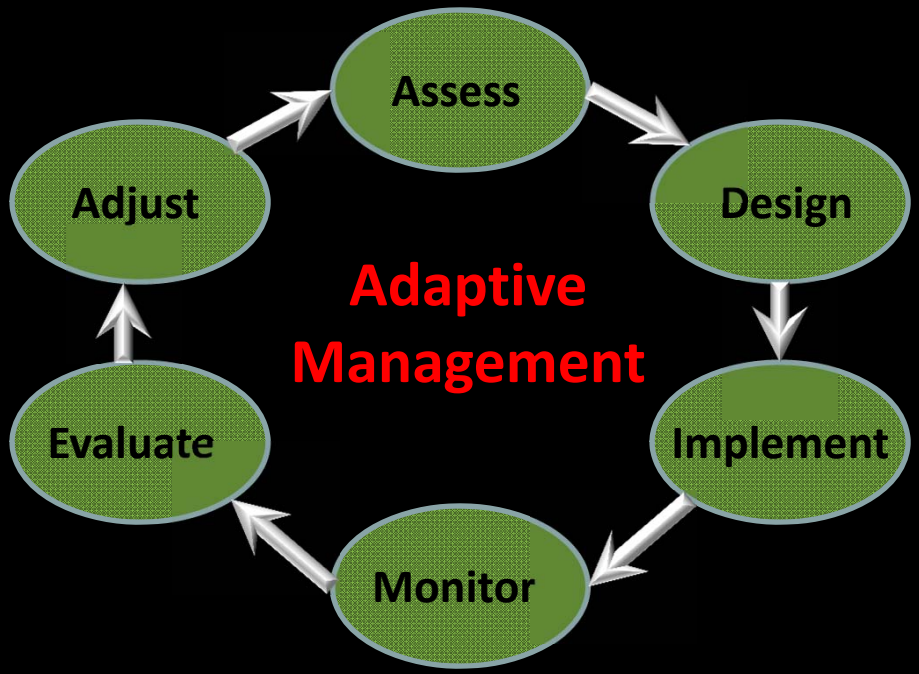
- Realizing the relationship between surface and groundwater to identify means to optimize water resources—and use of those resources
- To Utilize Integrated Management
  - Quantify the water resources of the basin or reach
  - Determine water demands
  - Identify “excess” streamflow supplies for utilization to meet goals

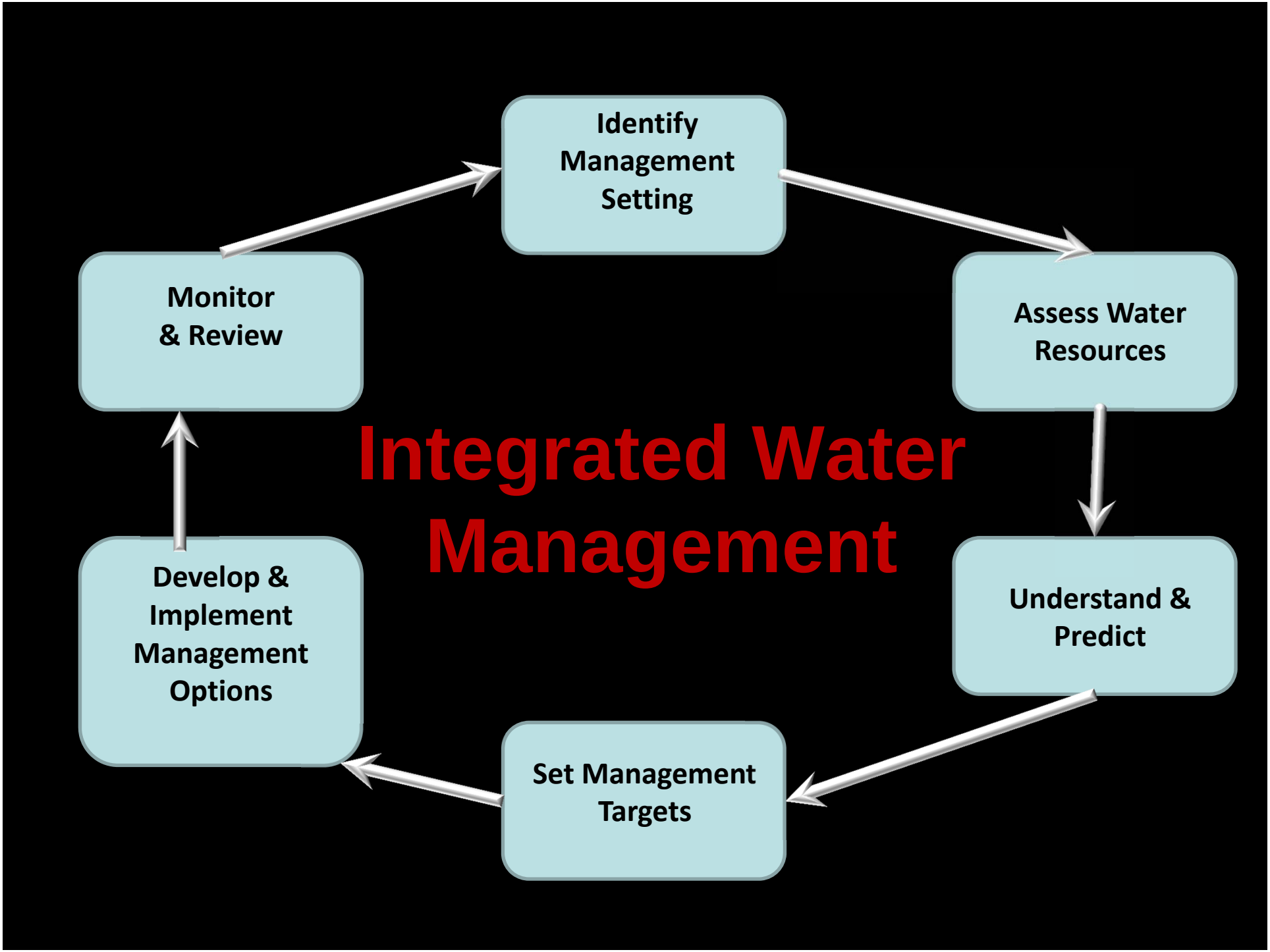
Why is it important?

- Surface & Groundwater are *connected*
- Semi-renewable resource
- Adaptive Management approach
- Flexible to meet local needs
- Apply to multiple scales (local, regional)

Adaptive Management

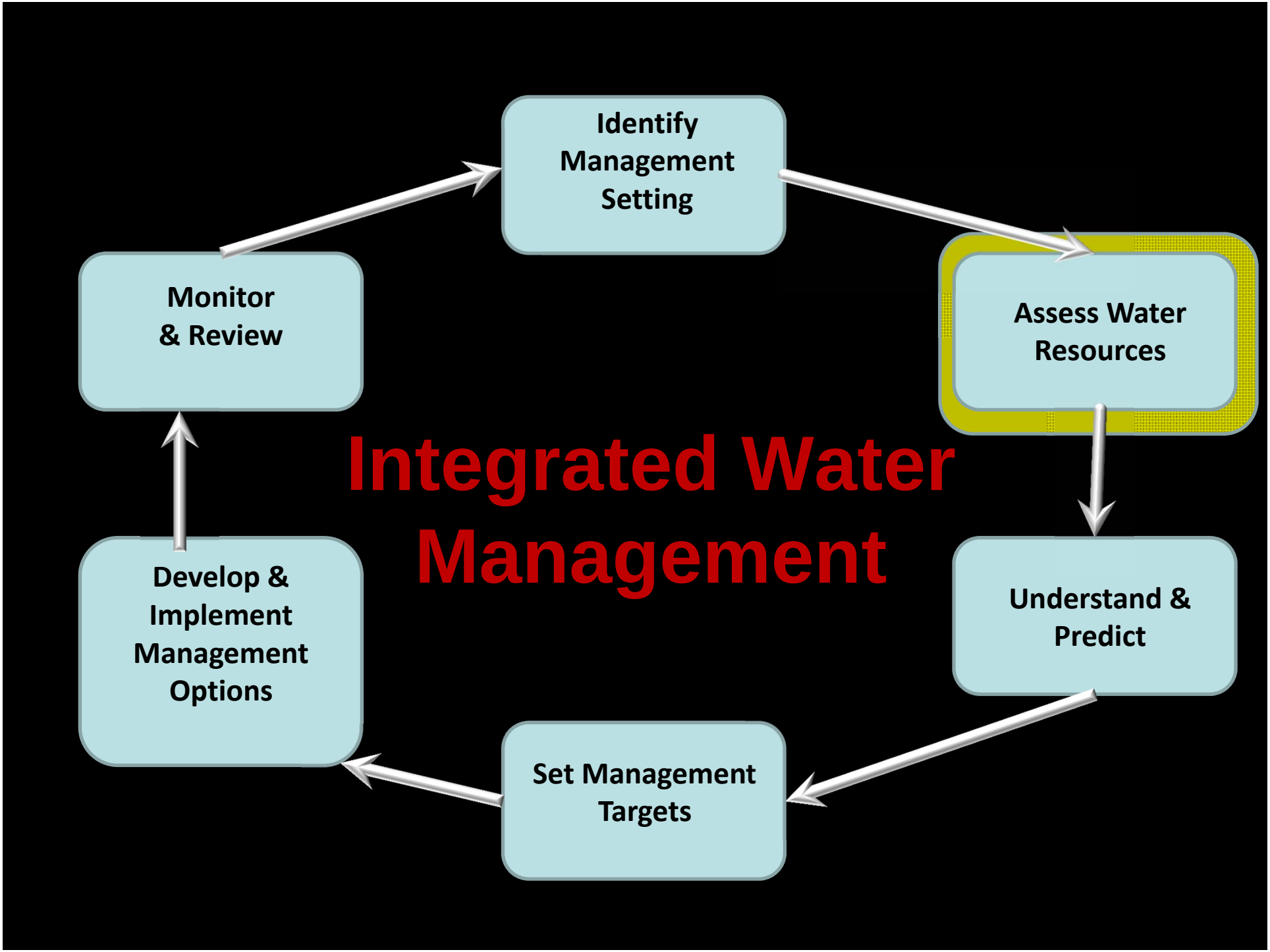
- What is adaptive management?
- Flexible Approach
- Fits with water management & planning
- Evaluation phase is key




Integrated Water Management
Identify Management Setting
Assess Water Resources
Understand & Predict
Set Management Targets
Develop & Implement Management Options
Monitor & Review

Management Setting

- First step in the cycle—may be adjusted through the adaptive management process
- Work with local NRDs, stakeholders, and public to determine local concerns
- ‘What do we want to do?’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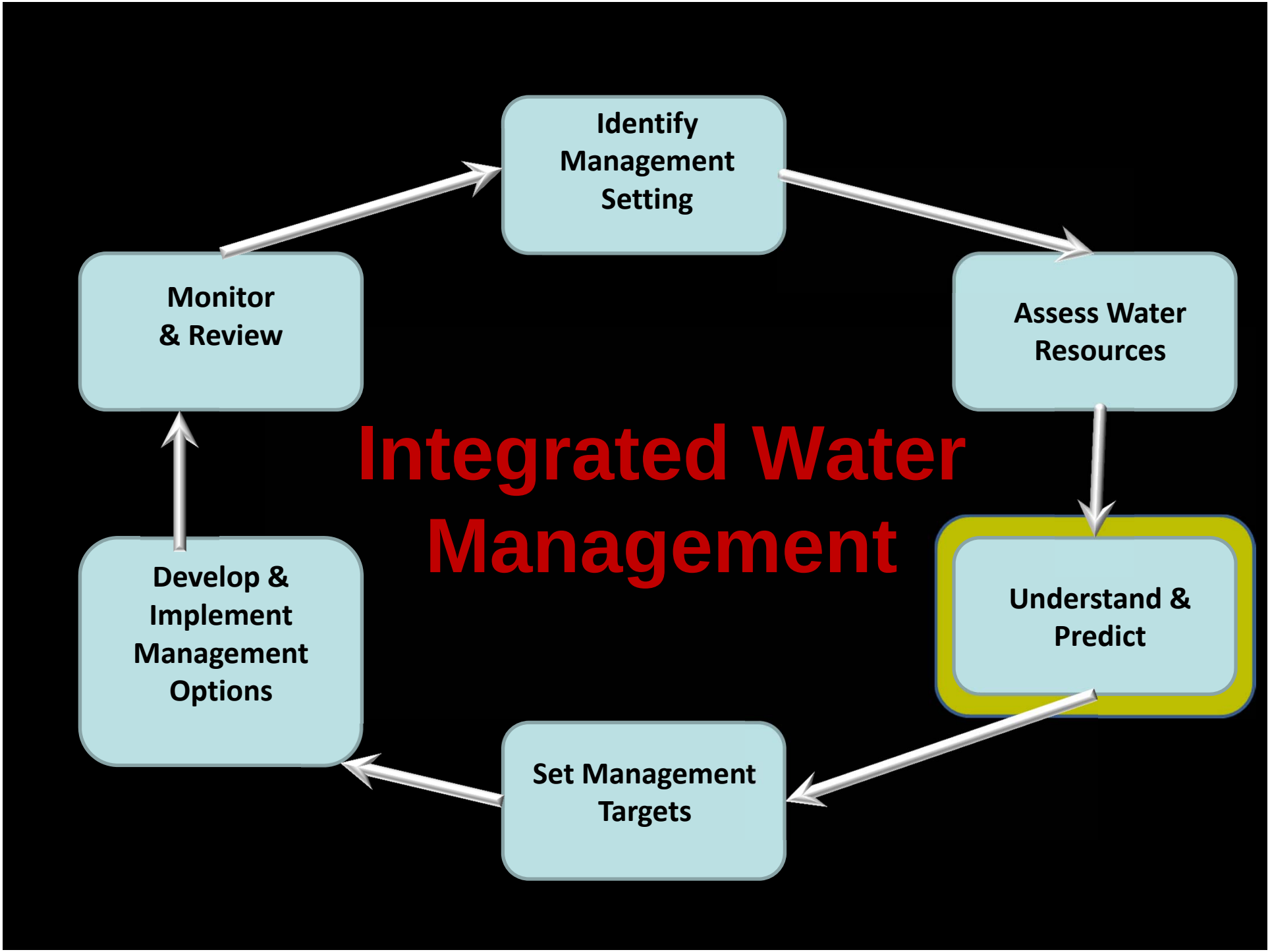
Assessing Water Resources: Understanding the Water Supply

- Water Budgets & Transient Models are imperative to understanding the system
- Uses must be understood in order to quantify the water supply
- The undepleted “Virgin” streamflow is our water supply
- Use more than this supply—borrow from storage
- Is there available supply?
  - Excess flows
  - Increase storage
  - Easier than increasing supply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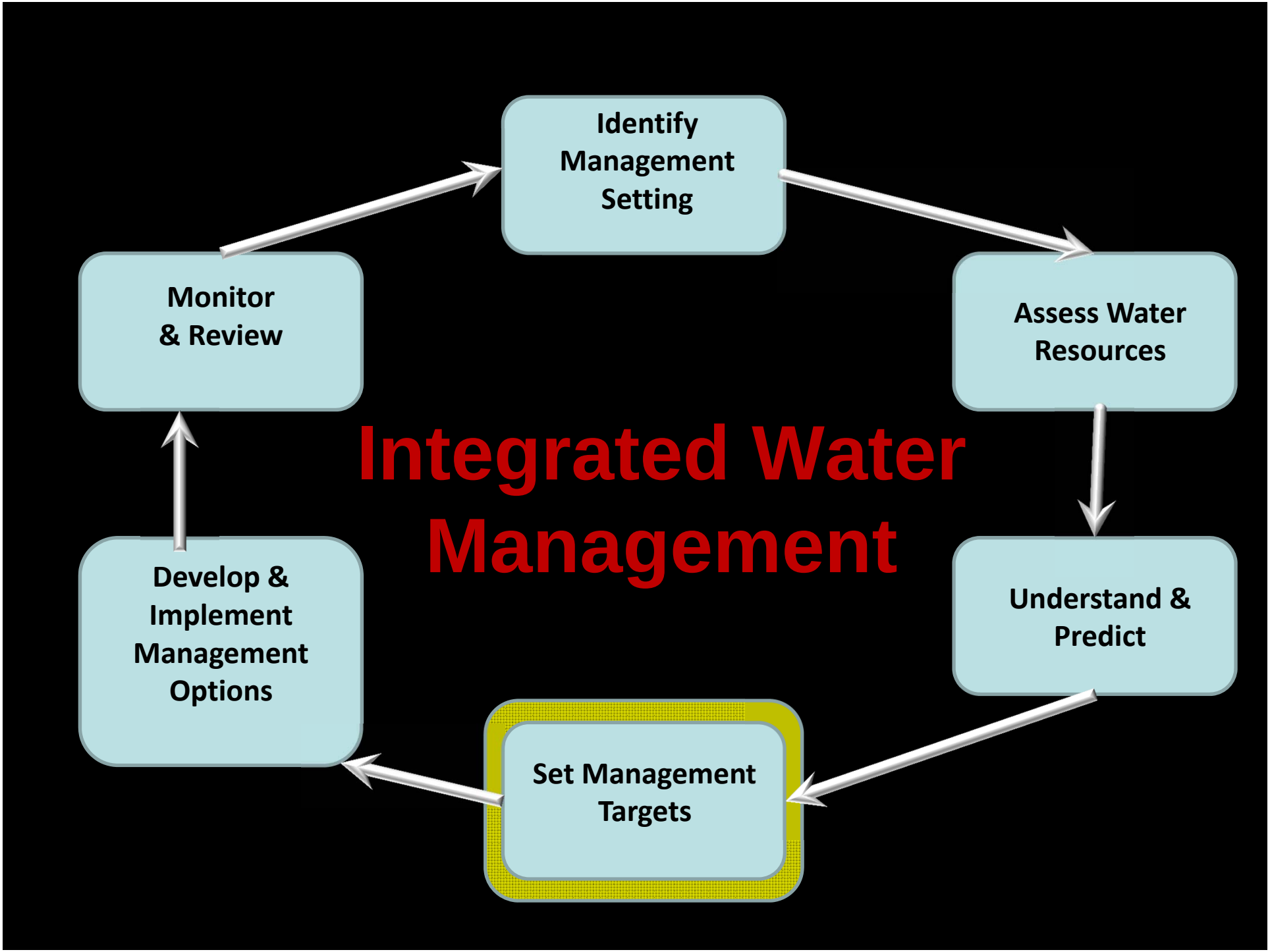
Understand & Predict

- Again, Water Budgets & Transient Models are essential to develop an understanding of the system
- Develop understanding of system dynamic—Can predict how the system will respond to certain stresses
- Retiming supplies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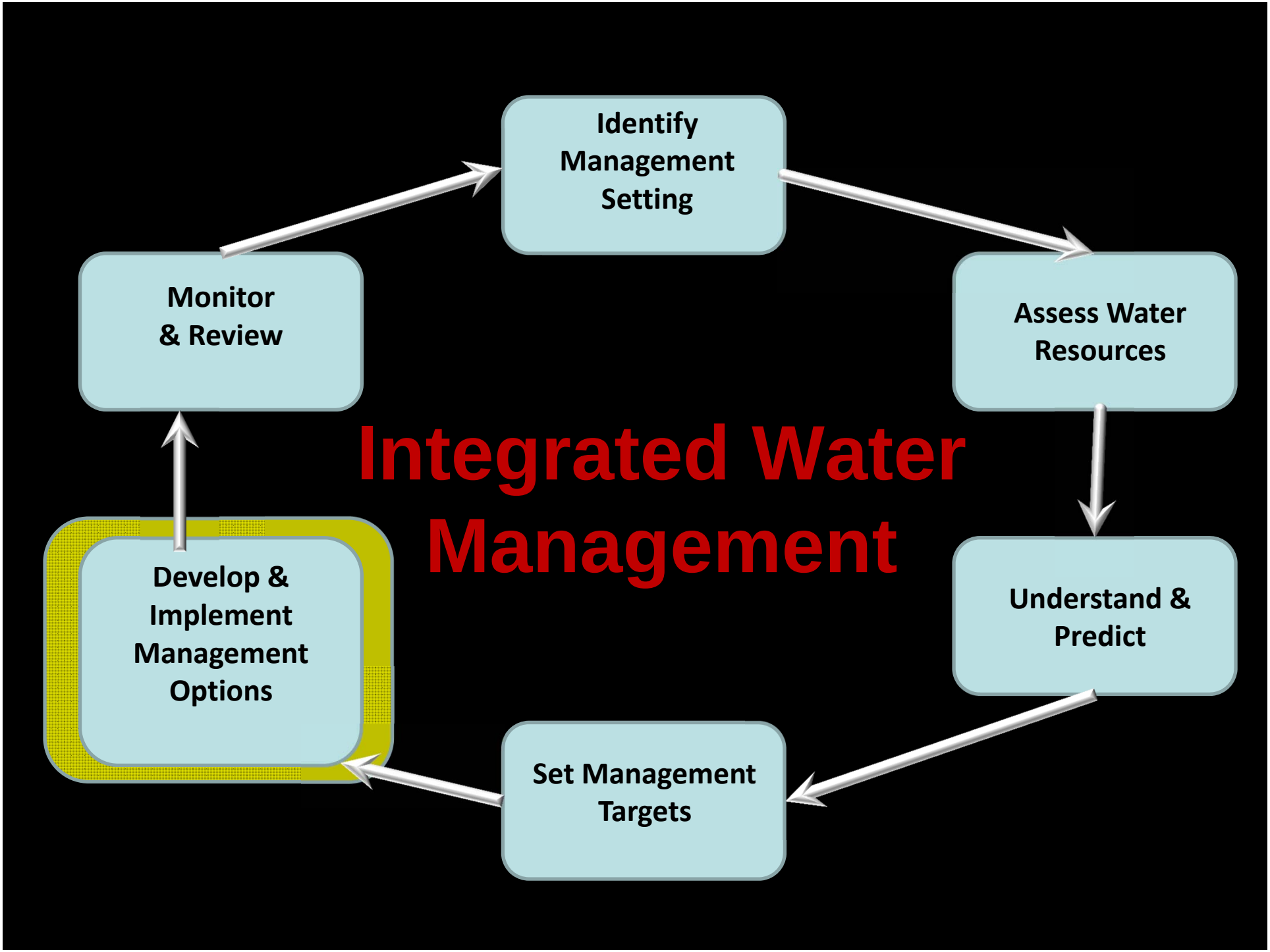
Set Management Targets

- The challenge is to manage the water supply and its current and future variability, in:
  - Time
  - Location
  - Types of Use

- What are the current and future needs?
- When/where does more water need to be available?

Excess Flows

- Republican River – current balance 40,000 acre-feet per year (over 5 years)
- Platte River – historical analysis suggests several hundred thousand acre-feet per year above Overton
- Niobrara River – Estimated excess to Spencer hydro of around 100,000 acre-feet per year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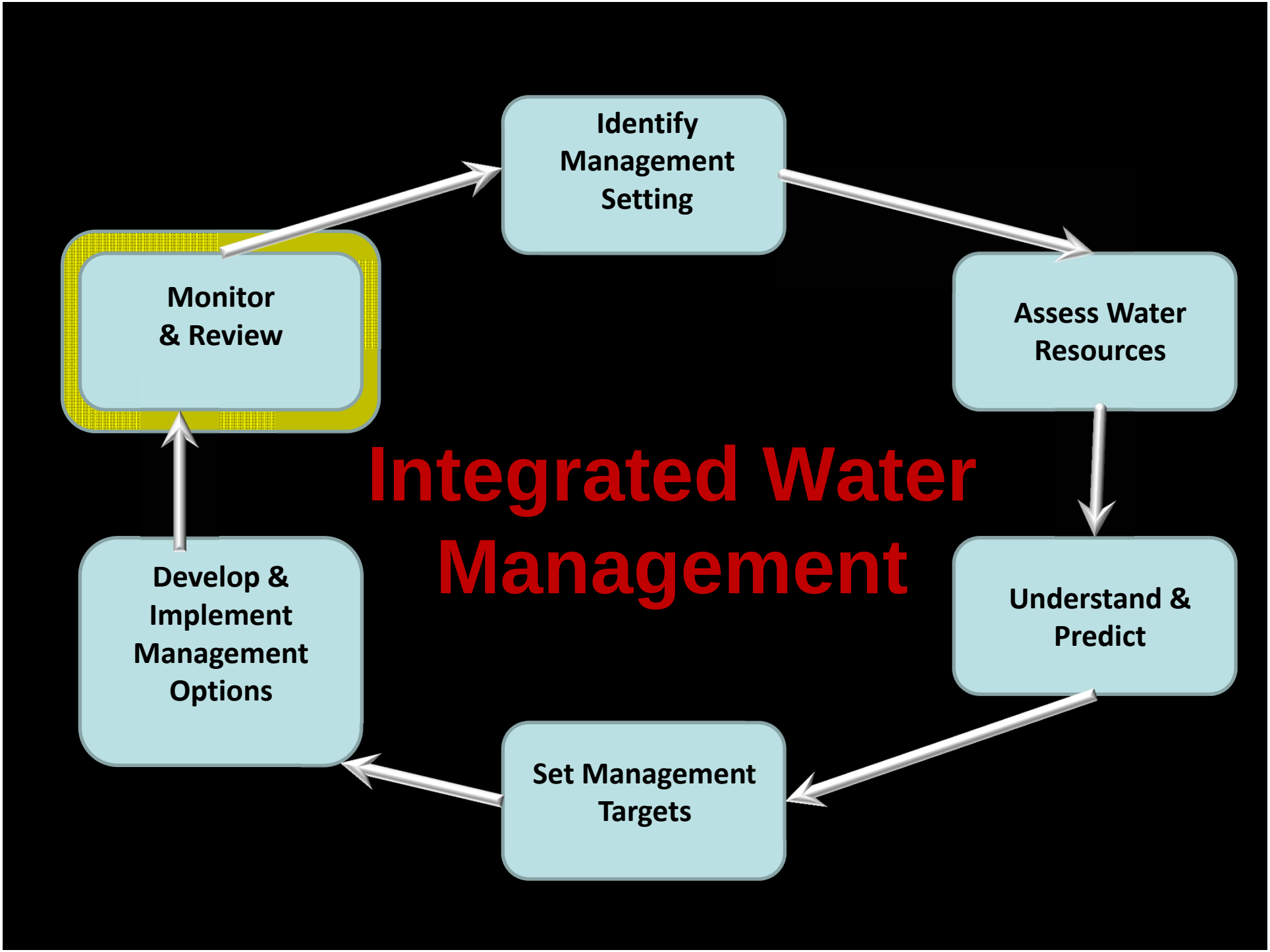
Management Options

- Input from stakeholders and public for potential list of goals & objectives
- Customized to local opportunities or needs
- Currently projects in Platte & Niobrara Basins to develop water management options
- Maximize benefits
- Minimize impacts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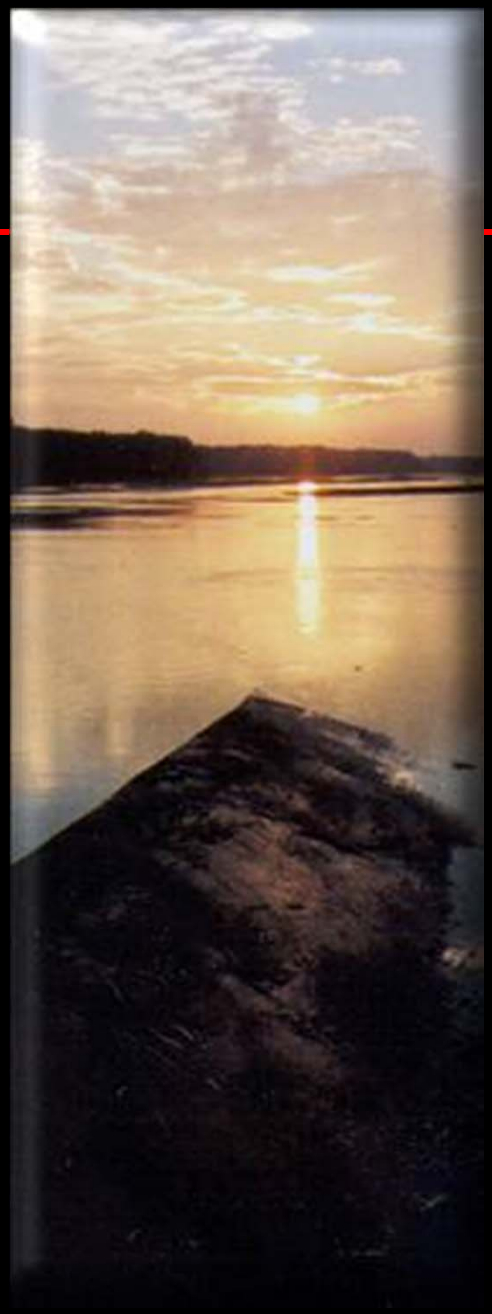


Monitor & Evaluate

- Key to understanding impacts of management actions
- If goals or objectives are not being met—can modify actions
- Incorporate new science or data
- Learning process
- No course or actions are ‘set in stone’

Pros & Cons of Integrated Management

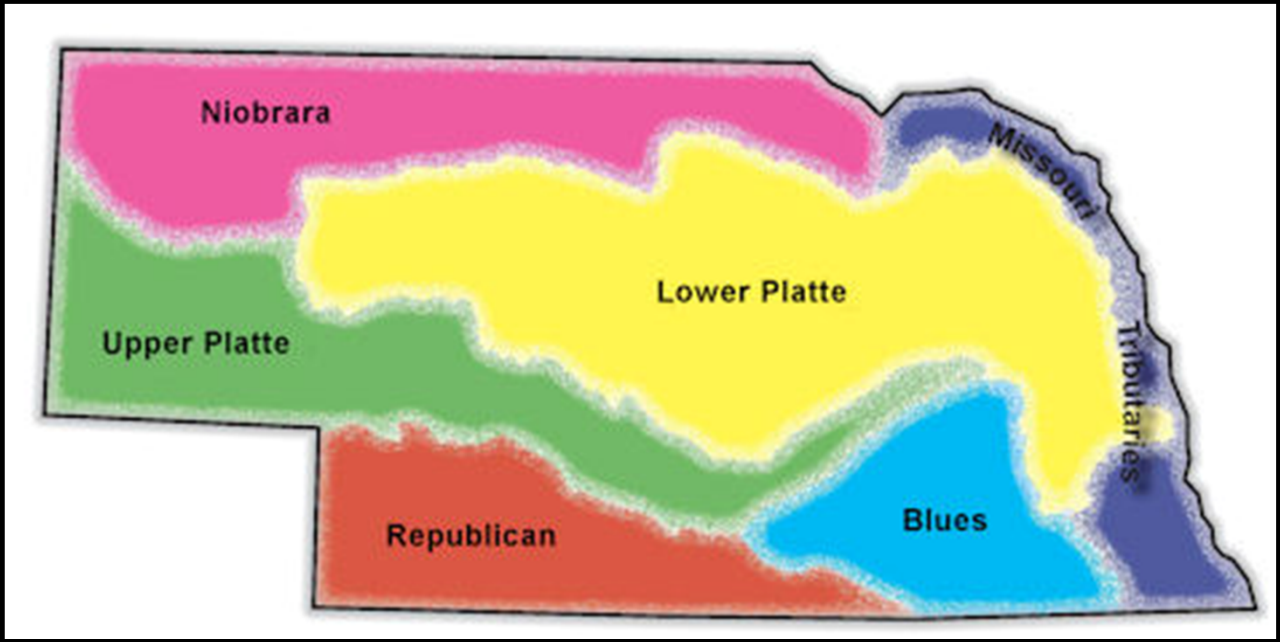
- Pros
  - Uses multiple sets of tools
    - Water Budgets, hydrologic models, economic analyses, etc
  - Flexible & Adaptable
  - Find best solutions
- Cons
  - Data intensive
  - Time intensive

Recap: Integrated Water Management

- Combines decades of hydrologic research
  - Precipitation, water budgets, models, etc
- Combines multiple model tools & approaches
- Can include non-hydrologic components, such as economic analyses
- Adaptable
- Customizable to meet local needs & concerns
- Optimize use of streamflow supply

Specific Basin Activities

- Upper Platte River
- Republican River
- Niobrara River



Upper Platte River Basin

- Encompasses six natural resources districts (NRDs) with portions declared over and fully appropriated
- Platte River Recovery and Implementation Program (PRRIP) in place to mitigate impacts of water-related activities through depletion plan implementation with goal to return to July 1, 1997, water use and to provide for the protection, restoration and maintenance of habitat for endangered species

RECOVERY IMPLEMENTATION PROGRAM
PLATTE RIVER

Republican River Basin

- Encompasses portions of four NRDs
- Republican River Compact Activity & Accounting
- KS v. NE upcoming Supreme Court case

Niobrara River Basin

- Encompasses portions of five NRDs
- Portions of the Niobrara River Basin have been declared fully appropriated
- Niobrara Basin Study
  - Bureau of Reclamation funded study providing $350,000 (in-kind funding) to define options for meeting future water demands
  - Assist in the development and implementation of IMPs and other water planning activities
  - Identify opportunities for meeting water needs through structural and nonstructural means
  - Analyze potential effects of climate variability on water supply

Summary

- The process of developing and adopting IMPs in fully and overappropriated basins is an important first step
- Implementing the proper monitoring and studies is critical to the success of integrated management
- The DNR, in collaboration with the NRDs, is developing the science needed for the success of integrated management and water planning for the State of Nebraska

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