

Planning Your Management

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Goals and Objectives (general history for wetland areas)

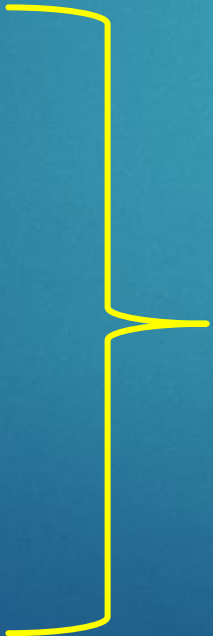
- ▶ Many areas established primarily for waterfowl early in history
- ▶ Goals derived from waterfowl population parameters that varied depending on location in flyway

- Breeding

- Breeding pairs
- Nest density
- Brood count
- Fledgling success

- Migration/wintering

- Use-days
- Peak populations



Numbers often based on data but:

Goals often were aspirational which contributed to intensive development

Goals and Objectives

(general history for wetland areas)

- ▶ **1986 North American Waterfowl Plan (NAWMP)**
 - ❑ Focus on waterfowl population goals
 - ❑ Guiding document for government and nongovernmental agencies
- ▶ **Development of other large-scale plans**
 - ❑ Identified population status of other wetland-dependent wildlife
 - US Shorebird Conservation Plan (2000)
 - North American Waterbird Conservation Plan (2002)
 - North American Landbird Conservation Plan (2004)

Goals and Objectives (general history for wetland areas)

► Impact of large-scale plans

□ National

- Consistent population goals and data collection
- Identification of general threats

□ Regional

- Ability to scale to regions (JVs), but energy is primary consideration
- Other critical factors (e.g., protein) difficult to incorporate
- Distribution & area of wetland types and habitats required not identified
- Management actions not identified

Goals and Objectives (general history for wetland areas)

► Impact of large-scale plans

□ Local

- Difficult to downscale population goals & energy/protein needs
- Collectively, population goals are difficult to attain
 - Limited area
 - Population cycles among species are not synchronous
 - Habitat requirements vary among and within species/guilds
- Often, the need to maintain wetland processes necessary for sustainability are compromised in favor of short-term results

Goals and Objectives (local area)

▶ Agencies develop plans that integrate habitat considerations

- ❑ Common approach is to

- Select species/guilds
- Determine desired populations
- Develop habitat objectives

} Often not linked to
Site characteristics

▶ Assumes direct link between

- ❑ Management actions and habitat condition
- ❑ Habitat condition and vertebrate response

▶ Factors that may invalidate assumptions

- ❑ Watershed land-use practices (sediment, toxicants)
- ❑ Weather
- ❑ Habitat conditions (e.g., quantity, quality) at larger spatial scales

Habitat-based Objectives (local scale)

► Advantages

- ❑ Monitoring habitat responses to management can be used to
 - Reduce on-site uncertainty
 - Refine management prescriptions (adaptive management)
- ❑ Habitat parameters at local scale more predictable / understandable
- ❑ More reliable method of assessing habitat productivity/health
- ❑ Better basis for determining future needs

► Disadvantages

- ❑ Value limited if developed without recognition of site characteristics
- ❑ Uncertainty still exists (factors other than habitat influence wildlife use)
- ❑ Knowledge base is limited in some cases
- ❑ Some important parameters costly or difficult to monitor

Goals and Objectives (local area)

- ▶ Appropriateness of habitat objectives must be
 - ❑ Evaluated in the context of the landscape and
 - ❑ Reassessed periodically as environmental conditions change
 - Environmental knowledge
 - Land use
 - Water quality (sediment, chemicals, nutrients)
 - Water quantity (climate change, over appropriation)
 - Scientific progress
 - Ecology (abiotic and biotic factors)
 - Technological advancements (e.g., equipment, spatial imagery)
 - Social awareness
 - Importance of public engagement

Landscape Condition

► Fewer wetlands

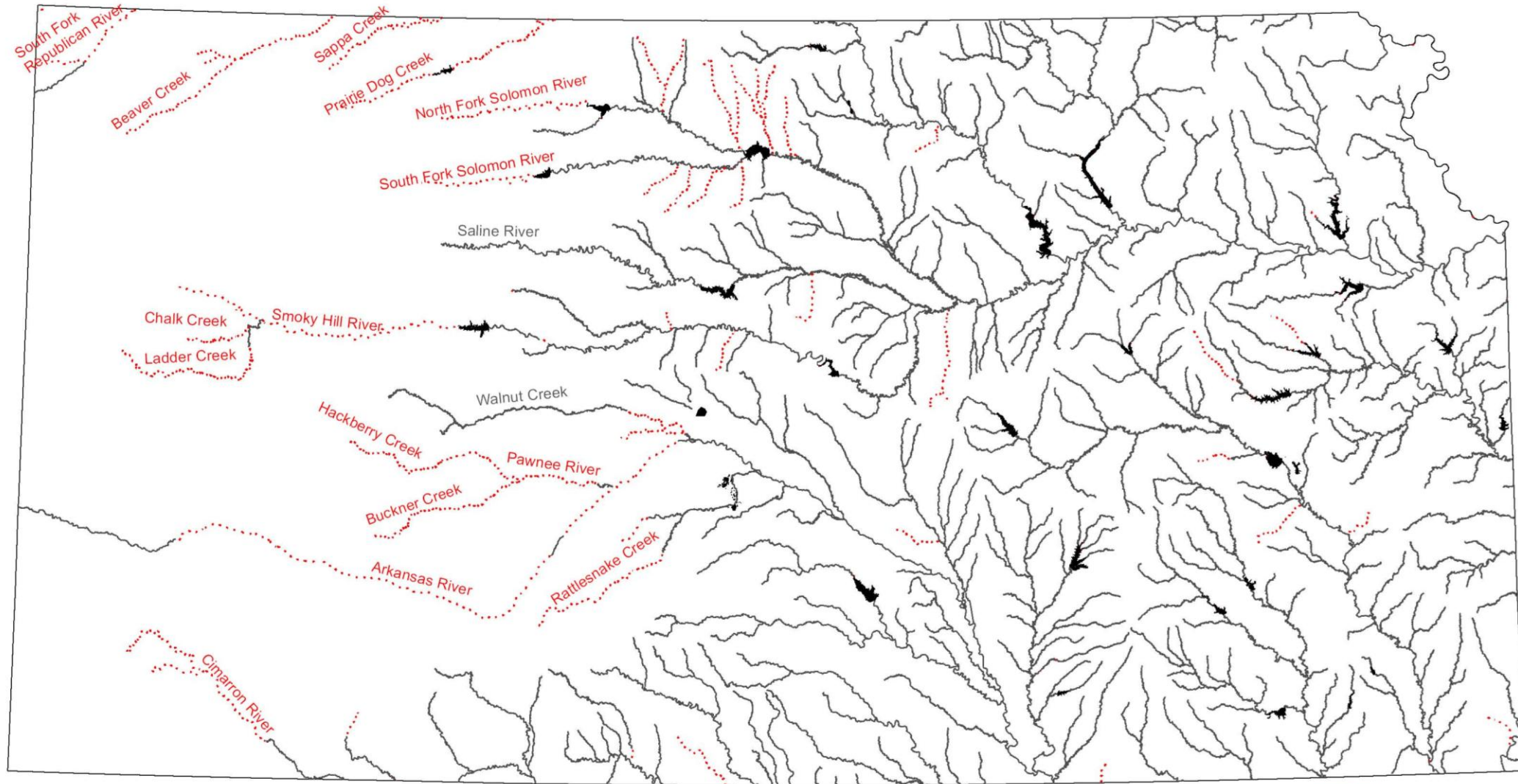
- ❑ Altered spatial distribution
- ❑ Reduced area/diversity of wetland types

Wetlands constituted 11% of landscape in 1600's but declined to 5% by mid-1980's [NRC 1992]

Historic wetland area in the Rainwater Basin has declined from 204,436 to 33,336 acres(16.3%) in 2004 [RWB CCP 2006]

More than 350 stream miles have been lost during the last 65 years in the Great Plains [Perkins et al. 2017]

Altered Stream Hydrology



Streams regarded as perennial in 1961 but nonperennial in 2009

Streams regarded as perennial in both 1961 and 2009

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Landscape Condition

► Fewer wetlands

- ❑ Altered spatial distribution
- ❑ Reduced area/diversity of wetland types

► Reduced wetland quality

- ❑ Hydrology
- ❑ Nutrients
- ❑ Sediments
- ❑ Chemicals

1.2 million miles of U.S. stream have modified natural patterns of streamflow [USGS 2019]

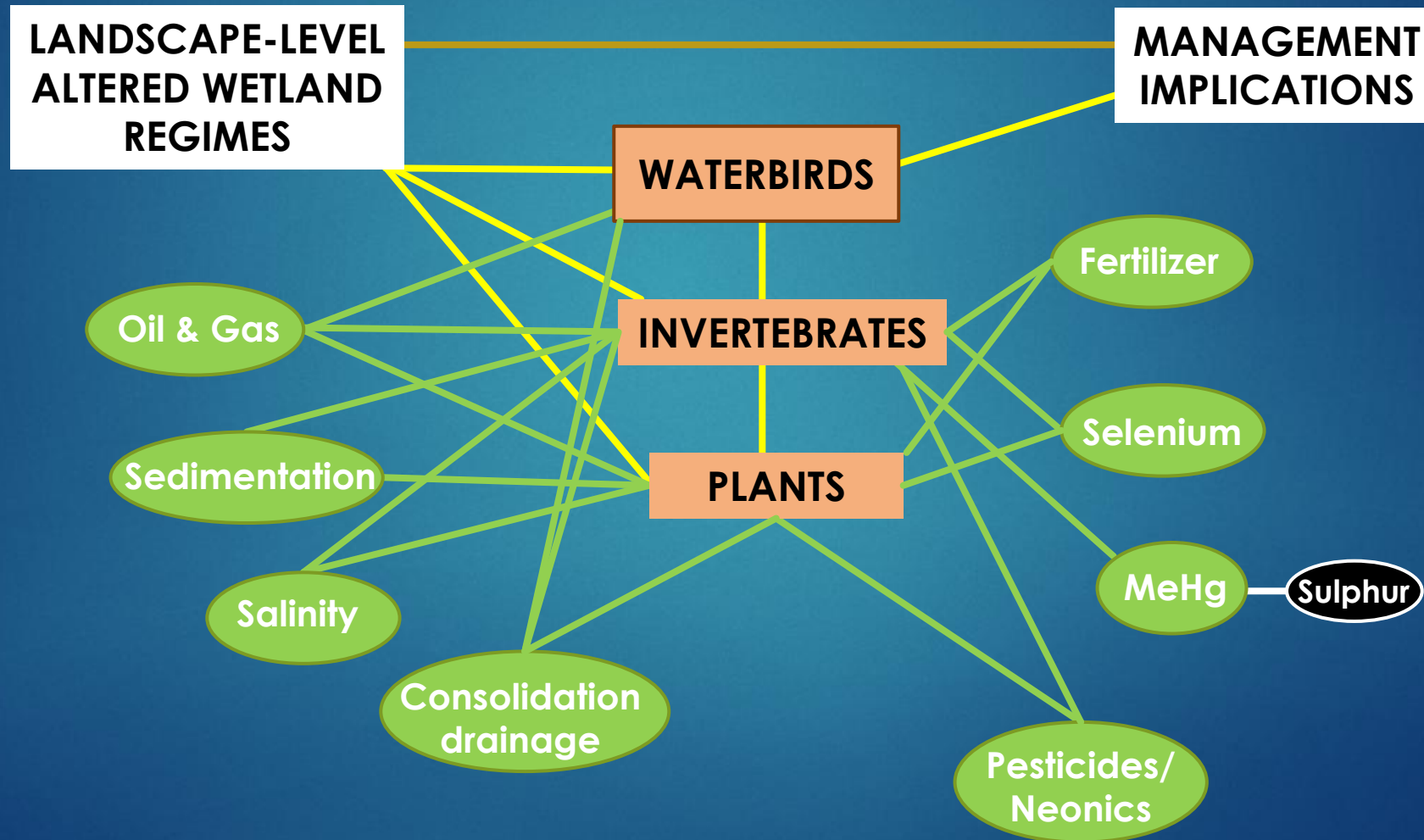
“...90% or more streams, groundwater, stream & estuarine sediments, & freshwater fish sampled have at least one contaminant at detectable levels.” [Heinz Report 2002]

Leading causes: excess sediment, nutrients, and pathogens [USEPA 2000]

Of original playas in Southern High Plains, 60% may no longer function & 20% may be gone due to sediment [Burris & Skagen 2013]

North Dakota Wetland Managers

(workshop - why traditional techniques no longer work)



Landscape Condition

► Fewer wetlands

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► Reduced wetland quality

- ❑ Hydrology
- ❑ Nutrients
- ❑ Sediments
- ❑ Chemicals

► Increasing number of species in decline

Experts now believe we are in the midst of a sixth mass extinction [WWO 2022]

Since 1970, dabbling & diving duck populations increased 34%, but water solutions needed to avoid drastic declines in the American West [SOB 2022]

Since 1970, nearly 33% of waterbird species have exhibited population declines [SOB 2022]

Since 1980, 38% of shorebird species have suffered population losses exceeding 70% [SOB 2022]

Since 1900, at least 57 species & subspecies of NA freshwater fishes are extinct [Jelks et al. 2008]

1,163 invertebrate species listed as endangered [IUCN 2016]

Determining the goals & objectives of management is critical because only when the intent is clearly articulated can the outcome be evaluated to determine if management has been successful.

Holling 1978, Cairns 1989, Noss 1995

Setting Local Goals and Objectives

- ▶ Typically, area staff have primary responsibility
- ▶ Many plans include goals to
 - Provide habitat for multiple guilds/species
 - Often based primarily on what is desired
 - Often do not reflect what is appropriate for site characteristics
 - Preserve, restore, and enhance wetlands
 - Often do not specify the purpose of restoration/enhancement
 - Often do not explicitly state potential conflicts with other goals
 - Provide public with recreational opportunities
 - Often conflicts with wetland processes that drive productivity

Local Objectives (current state)

► Objectives to accomplish goals

- ❑ Often provide detailed species-habitat relationships
 - Conflicts among species life-cycle events often not considered
- ❑ Commonly do not consider processes and abiotic factors
 - Critical for determining appropriate management actions
 - Primary determinant of management success
 - Required for sustainable productivity

Setting Goals From A Management Perspective

Confusing plans/planning for strategy is a common mistake

- ▶ **Considerations required to develop realistic long-term goals**
 - ❑ Site characteristics
 - Landform (riverine, palustrine, lacustrine)
 - Abiotic factors / processes (range, variability within and among years)
 - Potential plant community composition (historic to current)
 - ❑ Species/guilds appropriate for site & associated habitat requirements
 - ❑ Environmental issues (e.g., sediment, contaminants, nutrients)
 - ❑ Infrastructure (location, use, limitations, **required modifications**)
 - ❑ Management capabilities and limitations

Setting Objectives Based on Realistic Goals is a Dynamic Process

- ▶ **Periodic evaluation of site conditions to identify**
 - ❑ Changes in abiotic factors and processes (refuge and watershed)
 - ❑ Capabilities/limitations of infrastructure
 - ❑ Realistic changes to infrastructure
 - ❑ Appropriate plant community/habitat types
 - ❑ Appropriate species
 - ❑ Potential strategies to provide sustainable habitat

Properties of Acceptable Objectives

▶ **Accountable**

- ❑ Clearly defines intent
- ❑ Biologically relevant
- ❑ Measurable/observable

▶ **Credible (defensible)**

- ❑ Based on ecological principles
- ❑ Achievable
- ❑ Facilitates adaptive management

▶ **Documentable**

- ❑ Promotes continuity among staff
- ❑ Basis for evaluating objectives
- ❑ Contributes to defensibility

▶ **Quantifiable/Measurable**

- ❑ Evaluate effectiveness of strategies
- ❑ Identify knowledge gaps

Management To Attain Goals & Objectives In Modified Systems

► Success requires

- ❑ Developing shared knowledge of abiotic factors & role in wetland/watershed processes & functions
- ❑ Application of knowledge to site-specific situations
 - Identify appropriate management scale(s)
 - Develop understanding of site potential
 - Identify type and cause of function disruptions

► Solutions require

- ❑ Focus on resolving issues related to functions, processes & values
- ❑ Cooperation among stakeholders to
 - Formulate strategies at appropriate spatial scales
 - Monitor (learn) and adapt strategies through time

Strategies (Achieving Objectives Based on Realistic Goals)

► Annual Management (operational) based on:

- ❑ Current conditions (plant community, water status, issues)
- ❑ Species/guilds appropriate for individual sites
- ❑ Associated habitat requirements (e.g., foods, structure)
- ❑ Chronology of use (when does it need to be available)
- ❑ Actions required to produce and provide habitat resources
- ❑ Restorations/modifications to be conducted

Example SMART Objective

(Specific, Measurable, Achievable, Results-oriented, Time-specific)

Static

Objective 1: From August 15th to October 1st, provide 100-250 acres of moist-soil habitat flooded to a depth of 12 inches or less. Foods will include seeds and invertebrates, whereas structure will be a mix of vegetated mudflats (70%) and moderately dense upright rushes/sedges (30%).

Target species: king rail, blue-winged teal, dowitchers , snipe

Wetland Type

Seasonally-flooded wetland (moist-soil)

Hydrology

Time, duration, depth, area (some dry)

Plant community

Structure, seeds, invertebrate substrate

Animal community

Species relevant to mission/purpose

Example SMART Objective

(Specific, Measurable, Achievable, Results-oriented, Time-specific)

Annual

2024 Wetlands: Units 3 (200 acres) and 5 (350 acres) have not been disturbed and perennial sedge/rush communities are dominant at lower elevation. Strategies to be employed include drawdown in April, prescribed burning of upper elevations in each unit to reduce vegetative cover during June, and reflooding August 1.

Note: If funding allows, reset stoplog structure in Unit 3 to permit complete dewatering and avoid constant problems with perennials).

Wetland Type

Seasonally-flooded wetland (moist-soil)

Hydrology

Area, Time of soil exposure and reflooding

Disturbance regime

Location, type, timing

Modifications

Hydrology in relation to plant community

Importance Of Objectives From A Management Perspective

► Not about success or failure

- ❑ Achieving objectives not under complete management control

► It is about **LEARNING** (understanding outcomes)

- ❑ Requires factual information on which to base evaluation
 - Number of annual management actions precludes memory
 - Annual management actions often have multi-year impacts
 - Multiple years often required to understand relationships
- ❑ Documentation facilitates
 - Identification of future needs (infrastructure, information)
 - Design of new/modified strategies
 - Information transfer (staff turnover)

Landscape Condition

- ▶ Integrity of many watersheds (ecosystems) in coterminous US compromised
 - ❑ Land use has altered physical properties (geomorphology, soils) and resulting plant and animal communities
 - ❑ Wetland loss has been extensive and continues
 - ❑ Modification of wetland processes altered and persistent
 - ❑ Changing climate (e.g., precip, temp, snowmelt patterns)

Landscape Condition

► Processes that drive structure/function of wetlands impacted

- Magnitude and resulting significance vary by watershed
 - Geography (e.g., montane, great plains, coastal)
 - Geomorphology (e.g., riverine, palustrine)
 - Watershed size (e.g., pothole, playa, riverine-associated)
 - Location, type & extent of disruption

Non-ecological Complications

► Agency missions and evolving policies

- ❑ Varies depending on agency
 - Some disparity among programs within agencies
 - Lack of coordinated response (is it really a unifying mission?)
 - Requires increased communication
- ❑ Application of knowledge in management complicated
 - Interpretation in context of site required
 - Requires good observational skills (monitoring)
- ❑ Often involves actions that
 - Require cooperation among agencies & private landowners
 - Focus on resolving issues related to wetland processes

Non-ecological Complications

► Budgets and funding sources for wetland process and function

- ❑ Addressing challenges can be costly & exceed annual budget
- ❑ “Special” funding often tied to other initiatives
 - Human use (e.g. hunting, nature observation)
 - Capital improvements (e.g., buildings, equipment)
 - Target species (e.g., pollinators, endangered species)

► Lack of knowledge/skills

- ❑ Communication (internal and external)
- ❑ Access to information (spatial imagery, literature)
- ❑ Access to individuals with relevant skills and experience

□ Duck Creek CA

Purchased in 1950 to establish a waterfowl hunting area in conjunction with Mingo NWR

□ MDC Design for the future (fiscal year 19-23 strategic plan)

Maintain and improve the ecological functions of Missouri's watersheds and wetland systems

Recover and maintain priority species of conservation concern to sustainable levels and support the conservation of Missouri's full diversity of fish, wildlife, and plants

