

Colorado Wetland Program Plan

2020-2024



May 2020

CNHP's mission is to advance the conservation of Colorado's native species and ecosystems through science, planning, and education for the benefit of current and future generations.

Colorado Natural Heritage Program

Warner College of Natural Resources
Colorado State University
1475 Campus Delivery
Fort Collins, CO 80523
(970) 491-7331

Report Prepared for:
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, CO 80202

Recommended Citation:
Marshall, S., and J. Lemly. Colorado Wetland Program Plan: 2020-2024. Colorado Natural Heritage Program, Colorado State University, Fort Collins, Colorado.

Front Cover: Floodplain wetlands in the Roaring Fork watershed. Photo: Sarah Marshall, 2019.

© Sarah Marshall and Joanna Lemly, CNHP

Colorado Wetland Program Plan

2020-2024

Sarah Marshall and Joanna Lemly
Colorado Natural Heritage Program
Warner College of Natural Resources
Colorado State University
Fort Collins, Colorado 80523



May 2020

ACKNOWLEDGEMENTS

The Colorado Wetland Program Plan has been developed by the Colorado Natural Heritage Program, with state agency and other statewide partner input and support. The authors would like to acknowledge the U.S. Environmental Protection Agency Region 8, Colorado Parks and Wildlife Wetland Wildlife Conservation Program, Colorado Department of Transportation Wetlands Program, and the Colorado State Land Board for their financial and in-kind support of this project. Special recognition goes to EPA Wetland Program staff Penney Trujillo, Billy Bunch, Ryan Kloberdanz, and Licia Maclear.

Staff from the following state agencies and organizations contributed valuable input, support, and/or review of the plan: Brian Sullivan and Raquel Wertsbaugh, Colorado Parks and Wildlife; Becky Pierce, Colorado Department of Transportation; Chris Sturm, Andrea Harbin Monahan and Rob Viehl, Colorado Water Conservation Board; Mindy Gottsegen and Lindsey Brandt, Colorado State Land Board; Chris Yuan-Farrell, Great Outdoors Colorado; Jeff Deatherage, Colorado Division of Water Resources; Cindy Lair, Colorado Department of Agriculture; and Aimee Konowal, Estella Moore and, John Duggan, Colorado Department of Public Health and Environment.



INTRODUCTION TO THE COLORADO WETLAND PROGRAM PLAN

Wetlands in Colorado are a vital, yet often under-valued resource. While their extent is less than 2% of the land area (Lemly et al. 2020), wetlands provide a host of essential services, including flood attenuation, groundwater recharge, nutrient cycling, water quality improvement, carbon sequestration, and habitat for a disproportionate share of the state’s biodiversity (Millennium Ecosystem Assessment 2005; Redelfs 1980 as cited in McKinstry et al. 2004). Wetlands in Colorado face a number of serious threats. The state’s population is rapidly growing. Under high-growth scenarios, the state’s population is projected to nearly double by 2050 to 10 million people; even low-growth scenarios project an increase of at least 3 million people in that timeframe (State of Colorado 2015). With rising population comes increased development and demand for municipal water, which puts pressure on all aquatic systems, including wetlands. In addition, climate change projections indicate warmer average temperatures in Colorado (State of Colorado 2018), which will have significant impacts on aquatic resources. Wetlands and riparian areas on Colorado’s eastern plains and western plateaus are particularly vulnerable to the potential impacts of climate change, including a reduced snowpack, earlier peak flows and lower summer base flows, reduced groundwater recharge, and wetland drying and loss (CNHP 2015a).

State agencies and state-based conservation partners play an essential role in the protection and management of a state’s natural resources. No single state agency is responsible for wetlands. Instead, multiple agencies and organizations play a role in their protection, regulation, and management. The intent of this Wetland Program Plan (WPP) is to tie together the priorities and objectives of existing state plans, along with new wetland management and protection goals, objectives, actions, and activities identified by key statewide wetland partners, into one comprehensive document for the next five years (2020-2024). Within this 5-year plan is a Core Element Matrix developed with input from multiple agencies, including the following four elements:

1. Planning, Conservation, Restoration, and Adaptive Management
2. Inventory, Assessment, and Monitoring
3. Regulatory Considerations for Wetland Protection
4. Partnerships, Education, and Outreach

TABLE OF CONTENTS

Introduction to the Colorado Wetland Program Plan	i
Acronyms and Abbreviations	ii
Agencies and Organizations	ii
Key Plans, Programs (including Grants), Legislation and Technical Terms	iii
What is Colorado’s Wetland Program Plan?.....	1
Plan Development.....	2
Colorado Wetland Tools and Resources	4
Core Element Matrix Definitions.....	6
Core Element 1: Planning, Conservation, Restoration, and Adaptive Management.....	7
Core Element 2: Inventory, Assessment, and Monitoring.....	17
Core Element 3: Regulatory Considerations for Wetland Protection.....	26
Core Element 4: Partnerships, Education, and Outreach.....	29
References	32

ACRONYMS AND ABBREVIATIONS

Agencies and Organizations

ACOE	U.S. Army Corps of Engineers
ASWM	Association of State Wetland Managers
BCR	Bird Conservancy of the Rockies
BLM	U.S. Bureau of Land Management
CCALT	Colorado Cattlemen’s Agricultural Land Trust
CDA	Colorado Department of Agriculture
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CFRI	Colorado Forest Restoration Institute, CSU
CNAP	Colorado Natural Areas Program, within CPW
CNHP	Colorado Natural Heritage Program
COL	Colorado Open Lands
CONPS	Colorado Native Plant Society
CPW	Colorado Parks and Wildlife, Department of Natural Resources
CSFS	Colorado State Forest Service, CSU Warner College of Natural Resources and Colorado Department of Natural Resources
CSU	Colorado State University

	Colorado Watershed Assembly
CWCB	Colorado Water Conservation Board, Department of Natural Resources
	Colorado Water Trust
DNR	Colorado Department of Natural Resources
DU	Ducks Unlimited
DWR	Colorado Division of Water Resources, Department of Natural Resources
EPA	U.S. Environmental Protection Agency
FAC	(Wetland) Focus Area Committee
GFF	Gates Family Foundation
GOCO	Great Outdoors Colorado
IRT	(Mitigation Banking) Interagency Review Team
IWJV	Intermountain West Joint Venture
MTNHP	Montana Natural Heritage Program
	NatureServe
NFWF	National Fish and Wildlife Foundation
NPS	National Park Service
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
PLJV	Playa Lakes Joint Venture
SLB	Colorado State Land Board, Department of Natural Resources
SRSN	Southern Rockies Seed Network
TNC	The Nature Conservancy
USFS	U.S. Forest Service
USFWS	U.S. Fish & Wildlife Service
WQCC	Water Quality Control Commission (CDPHE)
WQCD	Colorado Water Quality Control Division (CDPHE)

Key Plans, Programs (including Grants), Legislation and Technical Terms

§319	Section 319 of the Clean Water Act, Nonpoint Source Management Program (and grants)
§305(b)	Section 305(b) of the Clean Water Act, which requires states to assess and report on the quality of waters within their state; combined with the 303(d) list of impaired waters
§401	Section 401 of the Clean Water Act, which allows states to protect wetlands from chemical and other forms of alteration through the Section 401 certification process; the 401 certification becomes part of the 404 permit
§404	Section 404 of the Clean Water Act, which regulates the discharge of dredged or fill material into waters of the U.S., including many wetlands
ACEP	Agricultural Conservation Easement Program (includes Wetland Reserve Easements) through the Farm Bill (USDA-NRCS)
AIM	Assessment, Inventory, and Monitoring (BLM)

BMP	Best Management Practice
C Value	Coefficient of conservatism (for plant species)
CCP	Colorado Climate Plan (State of Colorado)
CODEX	Colorado Conservation Data Explorer (CNHP)
CSCORP	Colorado Statewide Comprehensive Outdoor Recreation Plan (CPW)
CWA	Clean Water Act (Federal)
CWP	Colorado's Water Plan (State of Colorado)
EO	Element Occurrence (CNHP)
FACWet	Functional Assessment of Colorado Wetlands method (developed by Brad Johnson for the CDOT Environmental Programs Branch)
FQA	Floristic Quality Assessment
HRF	Healthy Rivers Fund (Colorado Watershed Assembly)
HUC	Hydrologic Unit Code
ISF	Instream Flow program, which includes water rights for instream flows and natural lake levels (CWCB)
LLWW	Landscape, Landform, Water Flow Path, Waterbody (USFWS)
NARS	National Aquatic Resource Survey (EPA)
NGO	Non-governmental organization
NNL	National Natural Landmark (NPS)
NWCA	National Wetland Condition Assessment (EPA)
NWI	National Wetland Inventory (USFWS)
OW	State Outstanding Waters (CDPHE)
PCA	Potential Conservation Area (CNHP)
PFW	Partners for Fish and Wildlife Program (USFWS)
RESTORE	Restoration and Stewardship of Outdoor Resources Colorado Grant Program (GOCO, NFWF, Gates Family Foundation, DNR, CPW, CWCB)
	Riparian Reconnect project (COL and others)
S&T	Status & Trends (USFWS)
SWAP	Colorado's State Wildlife Action Plan (CPW)
SWSI	Statewide Water Supply Initiative (CWCB)
TMDL	Total maximum daily load
WPDG	Wetland Program Development Grant (EPA)
WPP	Wetland Program Plan
WWCP	Wetland Wildlife Conservation Program (CPW)

WHAT IS COLORADO'S WETLAND PROGRAM PLAN?

State agencies and state-based conservation partners play an essential role in the protection and management of a state's natural resources. The U.S. Environmental Protection Agency (EPA) encourages states and tribes to formulate strategic plans, called Wetland Program Plans (WPPs), to articulate goals and objectives for wetlands. To guide the structure of WPPs, EPA developed the Core Elements Framework (EPA 2009) which focuses on the following four core components of an effective wetland program.

1. Monitoring and Assessment
2. Regulation
3. Voluntary Restoration and Protection
4. Water Quality Standards for Wetlands

In Colorado, no single state agency is responsible for wetlands, but many agencies and organizations have their own plans that either specifically address wetland protection, regulation, and management or involve wetland and aquatic resources indirectly. Those plans include:

- Colorado Climate Plan: State Level Policies and Strategies to Mitigate and Adapt (State of Colorado 2018)
- Colorado's Water Plan (State of Colorado 2015)
- Colorado Natural Heritage Program 2017-2022 Five-Year Strategic Plan (CNHP 2017)
- Great Outdoors Colorado 2015 Strategic Plan (GOCO 2015)
- State Wildlife Action Plan (CPW 2015)
- Statewide Comprehensive Outdoor Recreation Plan (CPW 2019)
- Statewide Strategies for Wetland and Riparian Conservation: Strategic Plan for the Wetland Wildlife Conservation Program (CPW 2011)
- Statewide Water Quality Management Plan (CDPHE 2011)

The intent of this WPP is to tie together the priorities, goals, objectives, and actions embedded in existing state plans, and identified through the development of this WPP, into one comprehensive document. The agencies involved in the aforementioned plans explicitly support the development of a multi-agency WPP and recognize the benefits of having a consolidated wetland plan. Other states across the country have developed multi-agency plans, and these states report that the planning process has strengthened their programs by creating new and stronger partnerships and increasing the effectiveness of their actions (Bostwick et al. 2013). Without a WPP, efforts focused on Colorado's wetlands would continue in an ad hoc fashion, without the benefit of coordination and shared information and resources.

This WPP covers years 2020-2024. Within this 5-year plan is a Core Element Matrix developed with input from multiple agencies, including four core elements that differ slightly from the EPA's recommended elements. The elements chosen for Colorado reflect the specific priorities of Colorado state agencies and current regulatory environment.

The four core elements for Colorado are:

1. Planning, Conservation, Restoration, and Adaptive Management
2. Inventory, Assessment, and Monitoring
3. Regulatory Considerations for Wetland Protection
4. Partnerships, Education, and Outreach

The matrix includes an overarching goal for each of the four core elements, followed by more specific objectives, actions, activities, and details on who will lead and engage in each activity.

PLAN DEVELOPMENT

The development of this plan was funded by an EPA Region 8 Wetland Program Development Grant (CD-96852401). Prior to meetings with state agency staff, CNHP developed an online survey on statewide wetland priorities, threats, and needs. The survey was circulated among Colorado’s major wetland partners, starting with state agency staff, but also including key Wetland Focus Area Committee participants from across Colorado. Survey respondents were asked to list their top 2-3 statewide priorities (actions or policies) for the next 5 years to ensure that Colorado’s wetlands are maintained in a high-functioning state (Table 1). Responses were grouped by WPP Core Element and general category and were integrated into the Core Element Matrix to ensure that the WPP included stakeholders’ most important priorities. Additional input from WPP participants, including specific actions and activities, was included in the Core Element Matrix.

Table 1. Summary of survey responses on top statewide wetland priorities.

Core Element	Category	Survey Responses (direct quotes, anonymous)
Inventory, Assessment, and Monitoring	Prioritization	<i>Identify important wetlands.</i>
	Common Methods	<i>Promote cooperative and similar monitoring across agencies to help determine limiting resources for key wildlife species.</i>
Planning, Conservation, Restoration, and Adaptive Management	Prioritization	<i>Identify critical (wetland) areas through planning.</i>
	Funding and Technical Support	<i>Promote funding and availability of experienced staff for management of wetlands on public lands that addresses key conservation issues for that area (e.g., limiting resources at specific times of year).</i>
	Funding and Technical Support	<i>Increase human capacity to implement on-the-ground conservation.</i>
	BMPs	<i>Develop BMPs for livestock grazing in wetlands and riparian areas.</i>
	BMPs; Invasive Plants; Water Quantity	<i>Promote management of conservation easements to address invasive weeds and help promote better practices for effective and efficient use of water.</i>
	Invasive Plants; Climate Change	<i>Replace invasive species with resilient native plant species.</i>

Core Element	Category	Survey Responses (direct quotes, anonymous)
	Water Quantity and Quality	<i>Get wetlands on water planning/decision making radars and processes (“if not at the table will be dinner”).</i>
	Land Management	<i>Keep flood-irrigated lands flood-irrigated.</i>
	Water Quantity	<i>Continue protecting high -functioning areas through preservation of existing hydrology.</i>
	Water Quantity	<i>Restore degraded wetlands and riparian areas in headwaters to bring water table back up and “re-wet the sponge”.</i>
	Ecological Function	<i>Restore lost wetland and stream function.</i>
Regulatory Considerations for Wetland Protection	Water Quantity	<i>Protect wetland water quantity (hydroperiod).</i>
	BMPs	<i>Establish statewide development setbacks from rivers and streams.</i>

Common water quality and quantity concerns identified as having close ties to wetlands included future water supply, allocation, and changes in timing/delivery (including flooding and flood storage) associated with climate change and development. Water supply concerns included working with an already limited supply, and having an existing policy framework that often limits our ability to prepare for the future and develop novel solutions. Respondents also expressed concerns about groundwater quality and quantity, as well as nonpoint source pollution and wetland impacts from activities like grazing. When survey respondents were asked to identify wetlands they considered to be at greatest risk of degradation of functions or loss of area in the next 50 years, riparian wetlands along large rivers and valley bottom wet meadows were identified as being at greatest risk, followed by riparian wetlands along rivers on the eastern plains, headwater wetlands, playas, and high-elevation riparian wetlands (Figure 1).

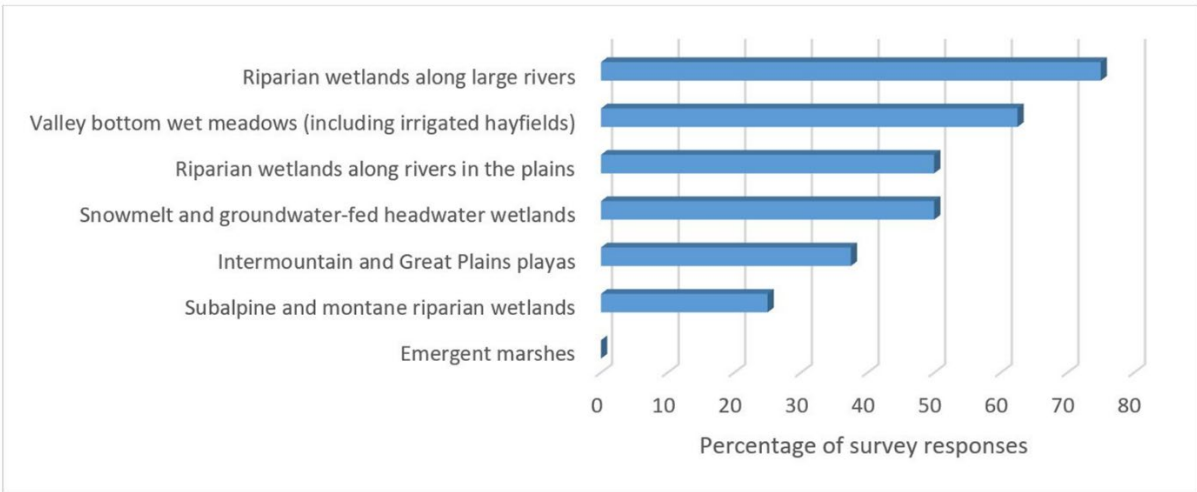


Figure 1. Colorado wetlands considered by survey respondents to be at greatest risk of functional degradation or loss of wetland area in the next 50 years.

Following review and analysis of results from the preliminary survey, CNHP hosted a WPP Working Group meeting at the State Land Board office in Denver in April 2018 to solicit additional state agency partner input on plan elements. This meeting was attended by staff from SLB, CWCB, DWR, WQCD, GOCO, CDOT, and CPW/CNAP. Following the initial Working Group meeting, CNHP followed up with individual meeting participants, created a shared document for agency participants to edit and add to the draft WPP Core Element Matrix developed from initial survey and meeting input, and attended several additional meetings related to state agency wetland priorities and related planning efforts, including the restoration-focused Headwater Wetlands Working Group meetings, hosted by CPW and attended by several other agency partners, and the Nonpoint Source Pollution Alliance meeting, hosted by CDPHE. The Core Element Matrix is a combination of state agency input regarding needs for Colorado's state wetland managers, as well as a compilation of ongoing and planned state-level wetland efforts by the Colorado Natural Heritage Program and state agency partners.

The Colorado WPP for 2020-2024 is a living document. CNHP plans to coordinate regular check-ins with the state agencies involved with preparing this document. We may adjust timelines or add or remove actions or activities as the state of wetland management changes over the next five years. This plan sets the stage and focuses our actions, but will not limit our efforts if and when new opportunities arise. We will periodically submit new versions of the WPP to EPA for review when major changes occur.

COLORADO WETLAND TOOLS AND RESOURCES

The Core Element Matrix mentions websites, mapping tools, and other resources used to share deliverables and products from activities in the Colorado WPP. The Colorado Natural Heritage Program and state agencies host a variety of publicly available, free, online resources to support wetland planning, conservation, restoration, management, and education in Colorado, including:

- **Colorado Wetland Information Center (CWIC, CNHP)**
 - **Colorado Wetland Inventory Mapping Tool** – an online mapping tool with several different datasets depicting the location and classification of wetlands in Colorado, along with wetland Potential Conservation Areas (PCAs) and landscape summaries by river basin, subbasin, and county
 - **Colorado Watershed Planning Toolbox** – an online mapping tool with over 80 data layers related to wetland attributes, functions, and conservation and restoration priorities alongside statewide water resource and habitat data layers
 - **Working in Wetlands** web pages – include wetland best management practices (BMPs), restoration guidance, conservation resources, regulatory information, and funding sources for restoration and protection
 - **Wetland and Riparian Ecological System Descriptions**, along with other information on Colorado's primary wetland types and management needs

- Links to manuals and supporting materials for all major **wetland assessment methods** used in Colorado
- **The Wetland and Riparian Plot Database** (to be released by CNHP in 2020) – a searchable database with wetland condition, plant lists, soil descriptions, and other information from nearly 3,000 wetland and riparian plots across Colorado; also displayed in the Colorado Wetland Inventory Mapping Tool
- A **digital library of all past CNHP wetland reports** (including county surveys)
- **Colorado Wetlands Mobile App** (CNHP)– a smartphone application with wetland mapping and images, identification details, range maps, and ecological information for 771 plant species occurring in Colorado’s wetlands
- **Field Guide to Colorado’s Wetland Plants** and regional pocket guides for the Eastern Plains, Southern Rocky Mountains, and Western Slope (CNHP) – print and PDF versions of plant species descriptions included in the Colorado Wetlands Mobile App, with pocket guides distributed to partners and landowners across Colorado to increase knowledge and awareness of wetland ecosystems
- **Wetlands priority species fact sheets and habitat scorecards** (CPW) – species descriptions, distribution information, habitat conditions, management recommendations, and criteria for evaluating potential and restored habitat for Tier 1 and Tier 2 wetland-associated species in Colorado’s State Wildlife Action Plan (SWAP) (CPW 2015)
- **CDOT Wetland Program** website – includes guidance and links for field guides and tools, wetland mitigation, and assessment and monitoring
- **CDOT Online Transportation Information System** – includes a mapping tool that hosts fen mapping and other geospatial data relevant to transportation planning around wetlands
- **Watershed Prioritization Dashboard** (One Water Solutions Institute and WQCD; coming soon) – helps users prioritize watersheds for water quality-focused conservation and restoration activities using national and state-level geospatial data (including some wetland-related layers) and a Multi-Criteria Decision Analysis approach

CORE ELEMENT MATRIX DEFINITIONS

The Core Element Matrix begins with an overarching goal for each of the four core elements of this 5-year plan, followed by more specific objectives, actions, activities, and details on who will lead and engage in each activity. Some actions and activities overlap slightly, or may relate to multiple core elements. Definitions of each component of the matrix are provided below. The full matrix table for each element is preceded by a brief description of the element, the overarching goal for the element, a consolidated list of all objectives and actions, and a list of related state agency or organization goals and strategies related to the element.

CORE ELEMENT: One of the four EPA Core Elements OR a modified or suggested additional element for Colorado. The WPP detailed in this document contains slightly revised element names that are more inclusive of other overarching elements and concepts included in the EPA's Core Element framework, and reflect current wetland activities and policies in Colorado:

1. Planning, Conservation, Restoration, and Adaptive Management
2. Inventory, Assessment, and Monitoring
3. Regulatory Considerations for Wetland Protection
4. Partnerships, Education, and Outreach

GOAL: High-level accomplishment that bring us closer to protecting and restoring wetland resources for their environmental, human health, and economic benefits.

OBJECTIVE: A measurable target within a given goal.

ACTION: Groups of activities that support strategic progress toward WPP goals.

ACTIVITIES: Specific activities and projects that will further the goals and objectives of the WPP in the next five years (e.g., things that will need collaboration/funding/leverage/support).

YEARS: When will the activities occur?

ACTIVITY LEAD: Who will lead the activity/ies?

PARTNERS: Who will help accomplish the activity?

NOTES AND LINKS TO EXISTING PLANS AND FUNDED PROJECTS: Related objectives/actions/activities identified in Colorado's Water Plan, the Colorado Climate Plan, the State Wildlife Action Plan, and other statewide documents, along with potential or existing funding sources.

CORE ELEMENT 1: PLANNING, CONSERVATION, RESTORATION, AND ADAPTIVE MANAGEMENT

This core element includes a vision for how the various state agencies and CNHP can work together to conserve the “best” Colorado wetlands, including both the full suite of Colorado wetland types and the habitat they provide for priority species and communities. This element also includes steps needed to restore degraded wetland and riparian habitats, elevate the state of restoration practice, and manage wetlands in the context of a changing climate and increased pressure from human development.

Goal: Protect and restore healthy, functioning wetlands and riparian areas through conservation, restoration, and adaptive management in the context of a changing climate.

Objective 1: Conserve Colorado's most significant wetlands and riparian areas.

- 1a) Identify shared conservation priorities across agencies.
- 1b) Identify and designate wetlands of state, national, and international significance.
- 1c) Explore the potential of ecotourism and other recreation to support wetland conservation.

Objective 2: Restore high-priority wetlands and riparian areas for improved watershed outcomes.

- 2a) Identify shared restoration priorities across agencies.
- 2b) Continue state-funded wetland and riparian restoration and enhancement programs.

Objective 3: Improve restoration practice and outcomes by facilitating information sharing, promoting innovative techniques, and addressing regulatory barriers.

- 3a) Develop and maintain decision support tools and other resources to support effective restoration, conservation, and watershed-scale planning and management.
- 3b) Address water rights-related barriers to restoring wetlands and riparian areas.
- 3c) Develop innovative, multi-disciplinary approaches to conserve, restore, and manage wetlands.

Objective 4: Address the state of science, and needed next steps, to protect Colorado's wetlands in a changing climate.

- 4a) Evaluate how climate change will impact Colorado's wetland habitats, including future water-supply projections, development, and proposed water projects.
- 4b) Research and promote the connection between wetlands and wildfire planning.

Related Overarching Goals and Strategies in Existing Colorado State Plans

Colorado's Water Plan (State of Colorado 2015):

- *Meeting Colorado's Water Gaps: Colorado's Water Plan uses a grassroots approach to formulate projects and methods that avoid some of the undesirable outcomes of the supply-demand gaps. The plan addresses the gap from multiple perspectives—such as water storage, reuse, recycling, integrated water management, restoration, and conservation (6.2, p.6-15).*
- *Recover Imperiled Species: Promote restoration, recovery, and resiliency of endangered, threatened, and imperiled aquatic and riparian dependent species and plant communities (10.3, p.10-12).*
- *Protect Healthy Environments: Understand, protect, maintain, and improve conditions of streams, lakes, wetlands, and riparian areas to promote self-sustaining fisheries and functional riparian and wetland habitat to promote long-term resiliency (10.3, p.10-12).*
- *Promote Protection and Restoration of Water Quality: The protection and restoration of water quality should be a key objective when planning for Colorado's current and future consumptive, recreational, and environmental water needs (10.3, p.10-12).*
- *Protect and Restore Critical Watersheds: Protect and restore watersheds critical to water infrastructure, environmental or recreational areas (10.3, p.10-12).*
- *Continue to support and participate in collaborative approaches to prevent listings under the Endangered Species Act. Promote the sustainability of endangered, threatened, and imperiled aquatic- and riparian-dependent species and communities (e.g., recovery programs, cooperative agreements, and other efforts) by developing a plan that compiles and develops near-term projects and methods. At the same time, the CWCB will support the strategic implementation of currently identified projects with technical and financial assistance (6.6; 10.3, p.10-12).*
- *Prepare for Climate Change: Respond to, monitor, and prepare for climate change (10.3, p.10-14).*
- *Work on creating resilient watersheds to protect, restore, and enhance water quality in the face of climate change (7.3, 10.3, p.10-14).*

Colorado State Wildlife Action Plan (CPW 2015, p. 309): *Develop decision support tools for prioritizing wetland habitats for conservation, based on anticipated benefits to Tier 1 wildlife species.*

Colorado State Wildlife Action Plan (CPW 2015):

- *Guiding principle No. 1: Encourage and support conservation actions that meet the needs of Species of Greatest Conservation Need. Research findings and successful management innovations into conservation actions.*
- *Guiding principle No. 2: Manage for healthy habitats and ecosystems so that all species will benefit*
- *Guiding principle No. 3: Create a strategy that will be flexible enough to incorporate new research findings and successful management innovations into conservation actions.*

Colorado Statewide Comprehensive Outdoor Recreation Plan CSCORP (CPW 2019, p. 43): *Private and public lands and waters are conserved to support sustainable outdoor recreation and wildlife habitat.*

Colorado Natural Heritage Program 2017-2022 Five Year Strategic Plan (CNHP 2017):

- *Goal 1: Conduct scientific research needed for effective conservation.*
 - *1.4 Build a foundation of science that leads to effective restoration decisions for priority species, habitats, and ecosystems.*

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Objective 1: Conserve Colorado's most significant wetlands and riparian areas			
Action 1a) Identify shared <u>conservation</u> priorities across agencies			
Identify highest wetland and riparian conservation priorities in Colorado utilizing known priority areas and connecting habitats; collaborate on activities to conserve high-priority wildlife habitat and other wetland benefits	2020-2024	CPW, CNHP, GOCO, all interested agencies and organizations	In partnership with many federal agencies and conservation organizations (USFWS, NRCS, IWJV, PLJV, DU, BCR, etc.), and including private land conservation opportunities such as easements.
Regularly review and update Potential Conservation Area (PCA) reports to incorporate changing landscape and on-site conditions, if known, and other agency priorities; consider wetland-specific PCA criteria	2020-2024	CNHP	PCA reports include supporting ecological processes, as well as threats and management and conservation needs for rare and sensitive species and ecosystems.
Research and document occurrences of wetland umbrella species such as pollinators and groundwater-dependent species, for inclusion in rare and at-risk plant and wildlife plans		CNHP, CPW, all interested agencies and partners	"Umbrella species" refer to species that, through their protection and habitat conservation, indirectly support a host of other co-occurring species within a given ecological community (e.g., Roberge and Angelstam 2004).
Action 1b) Identify and designate wetlands of state, national, and international significance			
Identify & potentially designate state-significant wetlands as State Natural Areas and/or National Natural Landmark (NNL) sites		CPW/CNAP, CNHP, NPS (NNL)	
Identify potential wetland candidates for State Outstanding Waters		WQCD, CNHP	Related to Regulatory Considerations for Wetland Protection Core Element, Action 1a.
Identify one or more candidate Wetland of International Importance (Ramsar site)		CNHP, TNC, CPW/CNAP	Potential sites include High Creek Fen, or other globally significant wetlands.

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Action 1c) Explore the potential of ecotourism and other recreation to support wetland conservation			
Research potential ecotourism opportunities involving wetlands	2020-2024	GOCO, CNHP, CPW	CCP (State of Colorado 2018) tourism action item: "Encourage diversification of activities at recreational areas statewide."
Research sustainable and accessible use for designated conservation sites (e.g., ADA-compliant elevated boardwalks)	2020-2024	GOCO, CPW, CNAP	CSCORP (CPW 2019) Priority I. Sustainable Access and Opportunity, Goal: "More Coloradans and visitors benefit from outdoor recreation and conservation."
Objective 2: Restore high-priority wetlands and riparian areas for improved watershed outcomes			
Action 2a) Identify shared <u>restoration</u> priorities across agencies			
Collaborate on shared restoration priorities for wildlife habitat in order to meet population goals for priority wildlife species	2020-2024	CPW, GOCO, CNHP	In partnership with many federal agencies and conservation organizations (USFWS / Partners for Fish and Wildlife Program, NRCS, IWJV, PLJV, DU, BCR, etc.).
Compile restoration priorities listed in watershed and stream management plans and translate these priorities to publicly available geospatial data to be displayed alongside priorities for wildlife habitat	2020-2024	CWCB, WQCD, CNHP	Display geospatial data in CNHP's Watershed Planning Toolbox, and other statewide mapping and prioritization tools. CNHP Strategic Plan (2017) 1.4a.ii: "Develop tools that planners and restoration professionals can use to prioritize restoration."
Identify candidate multi-agency collaborative project areas (e.g., Camp Hale), with a goal of several projects around Colorado in the next five years	2020-2024	All interested agencies and partners	CCP (State of Colorado 2018) water action item: "Collaborate across jurisdictions to protect and restore ecosystems associated with healthy watersheds."
Collaborate across agencies to prioritize and establish multiple-benefit wetland and riparian restoration projects that protect water quality (reducing sediment, bacteriological waste impacts, etc.) while providing flood hazard mitigation, sediment storage, and habitat benefits at a HUC 8 or similar watershed scale	2020-2024	WQCD, CWCB, CNHP, CPW , all interested agencies and partners	Potential use of 319 funding and may tie in with the Watershed Prioritization Dashboard tool. Other funding available through CWCB and other watershed protection grants. Related to wetlands and wildfire planning in Core Element 1, Action 4b.

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Promote floodplain reconnection efforts that explicitly include natural wetlands (e.g., beaver complexes) for flood hazard mitigation, sediment storage, alluvial aquifer recharge, wildlife habitat, and clean water	2020-2024	CWCB , all interested agencies and partners	CCP (State of Colorado 2018) water action items: 1) "Reconnect river channels with geomorphic floodplains so that average high water and peak flows are attenuated for the benefit of flood hazard mitigation, ecosystem function, and water storage"; 2) "Incorporate multiple objectives into flood mitigation and response activities to ensure attention to non-consumptive activities while promoting public safety." CCP (State of Colorado 2018) ecosystems action item: "Develop strategies to reduce impacts of climate change in aquatic systems through stream habitat improvement and connectivity."
Action 2b) Continue state-funded wetland and riparian restoration and enhancement programs			
CPW Wetland Wildlife Conservation Program	2020-2024	CPW	Includes "funding for all phases of wetland and riparian creation, restoration, and enhancement" as well as "funding for conservation easements and fee-title purchase through the Wildlife Habitat Program, wildlife and aquatic resource inventories, education and outreach, and project monitoring and evaluation." https://cpw.state.co.us/aboutus/Pages/WetlandsProjectFunding.aspx
CWCB Watershed Restoration Program, Colorado Water Plan, and Water Supply Reserve fund grant programs	2020-2024	CWCB	Includes environmental and recreation funding under the https://cwcb.colorado.gov/colorado-watershed-restoration-grants and https://cwcb.colorado.gov/colorados-water-plan-grants programs.
Multiple GOCO habitat restoration and land conservation programs		GOCO	Several grant programs fund restoration and conservation of wetlands and riparian areas. https://www.goco.org/grants
Restoration and Stewardship of Outdoor Resources (RESTORE) Colorado grant program	2020-2024	NFWF, GOCO, Gates Family Foundation, DNR, CPW, CWCB	Funds "at-scale habitat restoration, expansion and improvement projects across priority landscapes including river corridors, riparian areas, and wetlands." https://www.goco.org/grants/apply/restore-colorado-grant-program

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Healthy Rivers Fund	2020-2024	Colorado Watershed Assembly	Funded through the Colorado individual income tax refund check-off program. https://www.coloradowater.org/colorado-healthy-rivers-fund-1
<i>Objective 3: Improve restoration practice and outcomes by facilitating information sharing, promoting innovative techniques, and addressing regulatory barriers</i>			
Action 3a) Develop and maintain decision support tools and other resources to support effective restoration, conservation, and watershed-scale planning and management			
Expand the Watershed Planning Toolbox (and associated updated and expanded wetland dataset) to include all major source water subbasins for Colorado; work with state wetland managers to identify 1-5 priority HUC 8 subbasins for near-term Toolbox expansion	2020-2024	CNHP	In progress with EPA WPDG funding for the Roaring Fork Watershed. Seek additional funds for other watersheds. CNHP Strategic Plan (2017) 1.4a.ii: “Develop tools that planners and restoration professionals can use to prioritize restoration.”
Annually update the geospatial data layers included in the Colorado Wetland Inventory Mapping Tool and Watershed Planning Toolbox	2020-2024	CNHP	Overlap with Restoration core element. CNHP Strategic Plan (2017) 1.4a.ii (see above).
Begin integrating, and continue to add wetland data layers into the Colorado Conservation Data Explorer (CODEX)	2020-2024	CNHP, CPW, GOCO, CCALT, other state partners	In progress; may require additional funding if the CODEX platform is eventually used to host the Watershed Planning Toolbox in the future. CNHP Strategic Plan (2017) 1.4a.ii (see above).
Release and maintain the Watershed Prioritization Dashboard to help users prioritize watershed conservation and restoration efforts to maintain and improve water quality in Colorado’s waterbodies	2020-2024	WQCD, One Water Solutions Institute	
Maintain fen mapping and other wetland-related geospatial data layers in the Online Transportation Information System	2020-2024	CDOT	

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Develop, test, and refine models and protocols to prioritize conservation and restoration activities and plan around critical wetlands at a watershed or regional scale		CNHP , all interested agencies, partners, and stakeholders	Seek funding, utilize data layers and models developed in support of CNHP's Watershed Planning Toolbox and other statewide and regional planning tools. Include future climate change and development scenarios. Incorporate prioritization data layers and protocols into existing tools and publicly available websites. CNHP Strategic Plan (2017) 1.4a.ii (see above).
Create a statewide map for suitable beaver habitat	2020	CSU	Partially completed; Wohl lab (CSU) and CNHP working to refine model. CNHP will host final model data layers on Colorado Wetland Information Center website.
Pilot a beaver habitat suitability study at the HUC 8 scale	2020-2021	Colorado Open Lands , Ecometrics, CNHP / CSU	Ongoing, with support from Park County and Colorado's Water Plan Grant funding (CWCB). Includes other members of the Riparian Reconnect group.
Create an online database of wetland and riparian restoration and enhancement projects	2020-2021	CNHP , CWCB, CPW, CDOT, SLB, GOCO	In progress with EPA Wetland Program Development Grant (WPDG) funding. Most of the WPP survey respondents noted that this would be useful in their work. Searchable data base will be hosted on CNHP's Colorado Wetland Information Center website.
Update wetland and riparian guidance from the <i>Native Plant Revegetation Guide for Colorado</i> (CNAP et al. 1998), including recent research on controlling noxious weeds, and host information online	2022-2024	CNHP , CNAP, CPW, GOCO, CSFS, CWCB, BLM, USFS, CDA	Seek funding, potentially through CNAP, NFWF, BLM, GOCO, DNR, CONPS, and CPW (past funders and contributors from the 1998 guide). CNHP Strategic Plan (2017) 1.3b.iv: "Refine Best Management Practices (BMPs) for non-native species, especially near rare plant populations and wetlands." 1.4b.ii: "Review Colorado restoration practices, provide science-based guidance, and resources specific to Colorado's unique ecosystems."

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Action 3b) Address water rights-related barriers to conserving and restoring wetlands and riparian areas			
Maintain dialogue and collaboration among affected parties on needs for streamlining water rights reviews related to wetland conservation and restoration	2020-2024	DWR, CWCB, CPW, CNHP, CDA, restoration practitioners, NGOs	Water rights issues were ranked as one of the biggest obstacles to conserving and restoring wetlands in Colorado in the WPP survey.
Develop a new water rights guidance document for wetland restoration	2020-2021	DWR, CPW, CWCB	Internal agency discussions in progress.
Action 3c) Develop innovative, multi-disciplinary approaches to conserve, restore, and manage wetlands			
Utilize wetland and stream mitigation banking, and other forms of ecosystem services banking as potential revenue streams for State Lands, and in collaboration with private landowners to incentivize wetland protection and conservation	2020-2024	SLB, CPW	Include exploration of in-lieu fee programs, which have not been used for wetland mitigation to date in Colorado (but have been used for ESA-related wildlife mitigation, such as CDOT's Canada Lynx program with the USFS).
Explore the potential to link water quality trading to wetland conservation and restoration	2024-2024	WQCD, CDA	Tie to International Stormwater, Agricultural, and/or BMP databases (http://www.bmpdatabase.org/), or other water quality performance studies and data for Colorado.
Explore the potential for water banks specific to wetlands and include critical wetland habitats in instream flow decisions		CWCB, Colorado Water Trust	CNHP is available to assist in prioritizing wetlands at risk of loss due to hydrologic modification.
Identify statewide supply gaps in regionally appropriate wetland and riparian plant materials for restoration and enhancement activities; develop innovative strategies to meet future plant material needs for wetland and riparian restoration	2022-2024	CNHP, CNAP, CPW, CSFS, SRSN, CONPS, CDA	Seek funding and in-kind contributions from restoration practitioners. Also involve Southern Rockies Seed Network (SRSN), native plant nurseries, and seed suppliers. Consider potential for large-scale, post-natural disaster (fires, floods, droughts, etc.) needs, including long-term plant materials storage, and involving agricultural producers and other non-traditional partners in cultivating plant materials.

Planning, Conservation, Restoration, and Adaptive Management			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Objective 4: Address the state of science, and needed next steps, to protect Colorado's wetlands in a changing climate			
Action 4a) Evaluate how climate change will impact Colorado's wetland habitats, including future water-supply projections, development, and proposed water projects			
Synthesize existing literature for potential climate change impacts on wetlands under the various climate scenarios used in statewide water planning efforts (e.g., SWSI); identify and compile questions and knowledge gaps, and create a summary of climate change impacts by wetland type, region, or watershed	2020-2024	CNHP, other interested partners	CCP (State of Colorado 2018) ecosystems action item: "Coordinate among CPW, the CWCB, the private sector, and municipalities to evaluate how future water-supply projections will impact aquatic habitat." Utilize/update statewide work that CNHP and partners have already completed (e.g., CNHP 2015a), if possible, and modify for state agency use and statewide coverage if needed.
Rank the severity of potential climate change impacts to aid in prioritizing wetland conservation and management activities and identify potential indicators for monitoring climate change impacts	2020-2024	CNHP, other interested partners	
Identify climate change adaptation, mitigation, and resiliency measures to protect Colorado's wetlands in a changing climate	2020-2024	CNHP, other interested partners	Could be used as a supplement, or directly included in the next draft of the Colorado Climate Plan.
Action 4b) Research and promote the connection between wetlands and wildfire planning			
Research (and model) the role that wetlands play in reducing the severity and spread of wildfires, as well as the mitigating post-fire flooding, soil erosion, and sediment transport in streams	2020-2024	CFRI, CNHP, CSFS	CCP (State of Colorado 2018) water action item: "Continue research on the effects of climate change to wildfires, and in turn, the effects of post-wildfire conditions on flood risk." CCP ecosystems action item: "Encourage forest management on private, state and other lands to help capture and store carbon, reduce wildfire and insect/disease risk, improve wildlife habitat, and achieve other forest management objectives."

Planning, Conservation, Restoration, and Adaptive Management

<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Provide communities with case studies and examples of incorporating wetlands into regional and local resiliency plans (including community wildfire protection plans)	2020-2024	CWCB, CSFS, CFRI, CNHP	CCP (State of Colorado 2018) water action items: 1) "Assist local communities in building resilience through the development and implementation of regional and local resiliency plans."; 2) "Identify and apply lessons learned to response and outreach activities to future extreme events."

CORE ELEMENT 2: INVENTORY, ASSESSMENT, AND MONITORING

This core element includes both current, and planned future activities to document and monitor change in the extent, distribution, and ecological condition of Colorado's wetlands over time.

Goal: Track the extent and condition of Colorado's wetlands through comprehensive inventory, assessment, and monitoring that supports decision-making.

Objective 1: Develop, update, and maintain information-rich maps of Colorado's current and historical wetlands.

- 1a) Update and expand the statewide wetland dataset, including hydrogeomorphic, ecological, and functional attributes to support wetland conservation and restoration efforts.
- 1b) Document the location and condition of priority wetlands and wetland types across the state, focusing on wetlands that are rare, biologically significant, or located in areas that support critical habitat and other ecosystem services.
- 1c) Analyze changes in statewide wetland resources over time, including sensitive and high conservation value wetlands, to inform current and future management and protection needs.

Objective 2: Develop a statewide, integrated assessment and monitoring strategy, incorporating both probability-based and targeted sites, to routinely track and report on the condition of wetlands and aquatic resources.

- 2a) Develop a robust data management and distribution platform for wetland assessment and monitoring data.
- 2b) Assess wetland condition within each major river basin on a rotating 20-yr schedule.
- 2c) Actively participate in EPA's National Aquatic Resource Survey (NARS) program and integrate these data into larger datasets of Colorado aquatic resource condition.
- 2d) Partner with federal agencies to monitor the condition of rivers, streams, and wetlands on federal lands.
- 2e) Routinely monitor wetland and riparian restoration projects funded by state agencies or located on state lands.
- 2f) Routinely monitor established wetland and riparian reference sites and add to the reference network.
- 2g) Integrate wetland assessment and monitoring into ongoing reporting of aquatic resource condition.

Objective 3: Refine existing and develop new wetland assessment and monitoring tools.

- 3a) Continue to refine existing Level 2 and Level 3 wetland assessment methods (FQA, EIA).

- 3b) Develop standard protocols for assessing habitat quality for wetland-dependent wildlife species.
- 3b) Develop a standard monitoring framework for wetland and stream restoration to promote cooperative data sharing and to improve efficiency.

Objective 4: Secure sustainable funding for regular baseline inventory, assessment, and monitoring.

- 4a) Secure a state-level wetland appropriation to help fund regular baseline wetland data collection and updates.

Related Overarching Goals and Strategies in Existing Colorado State Plans

Colorado's Water Plan (State of Colorado 2015):

- *Prepare for Climate Change: Respond to, monitor, and prepare for climate change* (10.3, p.10-14).
- *Have fully supported classified uses—which may include drinking water, agriculture, recreation, aquatic life, and wetlands—of all of Colorado's waters by 2050* (CO WQCC plan, as cited in the Water Plan in 10.2, p. 10-7).
- *Develop common metrics for assessing the health and resiliency of watersheds, rivers, and streams* (6.6, 10.3, p. 10-12).

Colorado State Wildlife Action Plan (CPW 2015, p. 309): *Develop assessment techniques and conduct field-based assessments to determine the quantity and quality of wetland habitat currently available for Tier 1 wildlife species, and to evaluate the results of restoration.*

Statewide Strategies for Wetland and Riparian Conservation (CPW 2011, p. 17): *Assess program and agency accomplishments, impacts on wildlife populations, and assess net progress (incorporating habitat gains and losses) toward population objectives.*

2017-2022 Five Year Strategic Plan (CNHP 2017): *Goal 1: Conduct scientific research needed for effective conservation.*

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Objective 1: Develop, update, and maintain information-rich maps of Colorado's current and historical wetlands			
Action 1a) Update and expand the statewide wetland dataset, including hydrogeomorphic, ecological, and functional attributes to support wetland conservation and restoration efforts			
Enhance the statewide National Wetland Inventory (NWI) dataset to reflect the latest NWI codes and mapping guidance and produce a State of Colorado Wetlands report summarizing mapped wetland acres	2020	CNHP, CPW, USFWS	In progress with CPW funds. Results are summarized in the <i>2020 State of Colorado Wetland Report (CNHP 2020)</i> .
Support the development of high quality, updated NWI maps in priority areas of Colorado	2020-2024	CNHP, BLM, USFWS	CNHP is providing technical support to wetland mapping partners at University of Montana and Saint Mary's University of Minnesota while they create new NWI mapping through several large BLM-funded contracts. CNHP Strategic Plan (2017) 1.1.b: "Develop more accurate and comprehensive mapping of widespread ecosystems, including priority habitats such as wetlands and sagebrush," and 1.1.b.v: "Update wetland mapping in priority areas of Colorado and for priority wetland types (e.g., fens and playas)."
Add Landscape, Landform, Water Flow Path, Waterbody (LLWW) and functional attributes to statewide NWI data in order to model wetland ecosystem services	2020-2021	CNHP, MTNHP	In progress; seek additional funding to add LLWW and functional attributes in priority areas, which allow for more in-depth analyses of potential wetland functions and condition at the watershed scale.
Action 1b) Document the location and condition of priority wetlands and wetland types across the state, focusing on wetlands that are rare, biologically significant, or located in areas that support critical habitat and other ecosystem services			
Continue to identify new and update existing Element Occurrences (EOs) for rare wetland species and plant communities through county-wide, regional, or targeted surveys for wetlands with high conservation value	2020-2024	CNHP, USFS, NPS, USFWS, BLM, CPW, SLB, CNAP, NatureServe and others	Current projects in the Roaring Fork watershed and City of Aurora (EPA WPDG). Seek additional funding for other parts of the state, targeting underrepresented wetland types and regions (e.g., groundwater-dependent wetlands in eastern Colorado) as well as areas experiencing rapid change in land and water use and management.

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Refine and develop robust descriptions for wetland and riparian Ecological Systems, and make keys and descriptions accessible online via the Colorado Wetland Information Center	2020-2021	CNHP	Currently funded by EPA WPDG. Ecological System descriptions provide background information to help understand different types of Colorado wetlands, as well as information to support their conservation, management, and restoration.
Continue to map fen wetlands across Colorado, including coverage for the Routt, Pike San Isabel, and Arapaho Roosevelt National Forests, as well as other groundwater dependent ecosystems statewide (including the plains)	2020-2024	CNHP, USFS, EPA	Continue to seek funds through USFS and EPA for additional National Forests in CO, and for mapping on the plains. CNHP Strategic Plan (2017) 1.1b.v (see above).
Model hydroperiod and frequency of wetting for playas on Colorado's eastern plains	2022-2023	CNHP, CPW, PLJV	Seek funding.
Inventory, research, and assess groundwater-dependent wetlands and their ecological functions in Colorado's eastern plains	2020-2024	CNHP, CPW, CDA	Seek funding.
Create a statewide map of wetlands that are influenced or created by irrigation (direct irrigation vs. indirect influence), and look for intersections between these wetlands and wildlife habitat	2020-2022	CNHP, CWCB, CPW, CDA	An irrigation influence map may help water and wildlife managers discuss potential impacts of changing irrigation practices on species like Greater Sandhill Cranes that utilize some irrigated wetlands during migration and breeding seasons.
Map, inventory, and assess wetlands in urban areas and in rural/working landscapes to inform strategic water resource and habitat planning, protection, and restoration	2020-2024	CNHP, City of Aurora, others	In progress, with funding through an EPA WPDG: Assessment of Critical Aurora Urban Wetlands. Seek funds for additional surveys in rapidly growing urban areas (e.g., Greeley) and rural areas with at-risk wetlands due to changing water demand and management, climate change, and land use change. Consider habitat connectivity, and work with partners to identify focal watersheds and basins.

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Map, inventory, and monitor beaver-influenced wetlands, particularly in headwater areas; research BMPs for beaver wetland protection, restoration, and coexistence with built infrastructure (e.g., flow control devices)	2020-2024	CNHP, CSU, and all interested agencies and partners	A growing body of literature supports beaver-influenced wetlands being a key component of climate adaptation and mitigation, in terms of functions like sediment storage, flow attenuation, groundwater recharge, and wildlife habitat creation. Also explore potential for semi-automated beaver complex mapping.
Action 1c) Analyze changes in statewide wetland resources over time, including sensitive and high conservation value wetlands, to inform current and future management and protection needs			
Expand historical wetland mapping to key watersheds and high conservation value wetlands across the state	2020-2024	CNHP	In progress - EPA WPDG funding for the Roaring Fork Watershed. Seek additional funds for priority watersheds and wetland types.
Utilize derived products from Intermountain West Joint Venture (IMJV) remote sensing (intermountain basins in Colorado) to compare wetland extent, wetness, and associated ecological functions (including priority bird species habitat) across average, drought, and wet years	2020-2022	CPW, IWJV	In progress with CPW Funds.
Develop a Colorado wetland status and trends (S&T) program modeled after the USFWS program where wetland mapping is updated every 5 years in random areas of the state to statistically document change over time	2022-2024	CNHP, USFWS, CPW	Seek funding.
Map and track critical wetland areas that are most sensitive to water quality degradation from regulated pollutants like nutrients, sediment, and salts (e.g., rare species habitat, source water protection areas, kettle ponds, and fens in basins)	2020-2024	CNHP, WQCD, CPW, CDOT	See CNHP's Watershed Planning Toolbox for the Arkansas and South Platte Headwaters—many of the mapped wetland attributes, as well as geospatial data layers related to conservation of biodiversity could be used as a starting point. CNHP Strategic Plan (2017) 1.2.c.ii: "Expand monitoring of water quality, habitat conditions, ecological functions, and stressors in wetlands."

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Map and track critical wetland and riparian areas that are most sensitive to hydrologic modification		CNHP, CPW	Includes fens, wetlands and riparian areas that support rare species and general high biodiversity, etc.
<i>Objective 2: Develop a statewide, integrated assessment and monitoring strategy, incorporating both probability-based and targeted sites, to routinely track and report on the condition of wetlands and aquatic resources</i>			
Action 2a) Develop a robust data management and distribution platform for wetland assessment and monitoring data			
Develop the Wetland and Riparian Plots database, an online, searchable data repository for wetland assessment and monitoring data	2020	CNHP	Completed in 2020 with EPA WPDG funding.
Solicit data from wetland and riparian partners across the state to augment existing datasets	2021-2024	CNHP, USFS, NPS, USFWS, BLM, CPW, SLB, CNAP, NatureServe and others	
Develop a database module to store FACWet data (Johnson et al. 2013)	2022	CNHP, CDOT, ACOE	Seek funding and input on feasibility.
Action 2b) Assess wetland condition within each major river basin on a rotating 20-yr schedule			
Develop joint assessment objectives with multiple state agencies	2022	CNHP, all interested state agencies	
Prioritize river basins for assessment and establish a schedule for seeking funds to carry out sampling	2022	CNHP, all interested state agencies	Work with partners to identify a high-priority basin to for a random and targeted wetland inventory and ecological condition assessment. CNHP Strategic Plan (2017) 1.2c: "Assess the condition and functions of priority ecosystems (e.g., wetlands) at multiple spatial scales."
Initiate next river basin assessment project	20243	CNHP	Seek funding through an EPA WPDG.

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Action 2c) Participate in EPA's National Aquatic Resource Survey (NARS) program and integrate these data into larger datasets of Colorado aquatic resource condition			
Conduct base sampling for the 2021 National Wetland Condition Assessment (NWCA)	2021	CNHP, WQCD, EPA	Funding available from EPA via CDPHE WQCD. https://www.epa.gov/national-aquatic-resource-surveys
Carry out an intensification of the 2021 NWCA to document condition of wetlands across all of Colorado	2021	CNHP, WQCD, EPA	Seek funding through an EPA WPDG.
Conduct base sampling for all three applicable resource types (rivers and streams, lakes, and wetlands) starting in 2022 with likely transition to NARS 2.0	2022-2024	CNHP, WQCD, EPA	Funding available from EPA via CDPHE WQCD.
Action 2d) Partner with federal agencies to monitor the condition of rivers, streams, and wetlands on federal lands			
Monitor rivers, streams, wetlands and riparian areas on BLM land through the Aquatic and Lentic Assessment, Inventory and Monitoring (AIM) Program	2020-2024	CNHP, BLM	In progress with BLM Funds.
Monitor wetlands and riparian areas on other federal lands as opportunities arise	2020-2024	CNHP, NPS, USFS, NRCS	Current funding to monitor wetland on NPS lands. Seek funding to partner with USFS. Seek opportunities to partner with NRCS on private land conservation easement monitoring.
Action 2e) Routinely monitor wetland and riparian restoration projects funded by state agencies or located on state lands			
Monitor wetland and stream restoration and mitigation projects funded by state grant programs	2020-2024	CPW, CWCB, GOCO, CDOT, SLB, CNHP	Several state agencies currently conduct site-level monitoring at some, but not all project sites. CNHP is available to help identify and/or develop similar protocols and standardize monitoring approaches across agencies.

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Action 2f) Routinely monitor established wetland and riparian reference sites and add to the reference network			
Establish wetland reference network and make site-level data available online via the Wetland Plots Database	2020	CNHP	Initiated through an EPA WPDG. CNHP Strategic Plan (2017) 1.4a.i: "Identify reference networks of high quality sites to guide restoration."
Identify new wetland reference sites across a wide geographic range and continue to monitor these sites every 5 to 10 years	2020-2024	CNHP	Seek funding. CNHP Strategic Plan (2017) 1.4a.i (see above).
Action 2g) Integrate wetland assessment and monitoring into ongoing reporting of aquatic resource condition			
Report on wetland condition every two years in the 305(b) Integrated Report: Status of Water Quality in Colorado	2022, 2024	WQCD, CNHP	If funding is available from during the reporting period.
Report on integrated aquatic resource condition in Colorado as sampled through the NARS program, either separately or as part of the 303(b) report		CNHP, WQCD	Future goal.
Objective 3: Refine existing and develop new wetland assessment and monitoring tools			
Action 3a) Continue to refine existing Level 2 and Level 3 wetland assessment methods (FQA, EIA)			
Establish a repository or clearinghouse for various types of wetland assessment methodologies suitable for a variety of users and uses, with recommended application, BMPs, etc.	2020-2024	CNHP, CPW, BLM, USFS, CWCB	This would be a helpful resource for many local government and conservation organizations, and private landowners interested in better understanding, assessing, and managing wetlands.
Review, update, and expand C-values (coefficient of conservatism) for Colorado wetland and riparian plants	2020	CNHP, USFS, NPS, CSU, USFWS, NatureServe, NRCS, CNAP, BLM, and others	In progress, with EPA WPDG funding. C-values are strongly associated with hydrologic modifications and other wetland stressors.

Inventory, Assessment, and Monitoring			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Continue to refine Ecological Integrity Assessment (EIA) (Lemly et al. 2016) methods based on user input and continued data collection; enhance supporting documentation and training for the EIA method	2020-2024	CNHP	Seek funding. CNHP Strategic Plan (2017) 1.2.c.i: “Refine and promote the Ecological Integrity Assessment framework for assessing the condition of wetlands.”
Develop EIA module for managed wetlands	2021-2022	CNHP, CPW, USFWS, FACs	Seek funding. CNHP Strategic Plan (2017) 1.2.c.i (see above).
Develop joint training and documentation for EIA and FACWet so users can easily understand the differences	2021-2022	CNHP, CDOT	Seek funding.
Action 3b) Develop standard protocols for assessing habitat quality for wetland-dependent wildlife species			
Continue to develop and update state wildlife priority species factsheets and habitat scorecards for assessing wetland habitat elements before and after restoration, etc.	2020-2021	CPW, CNHP	In progress with CPW funds.
Develop and test standards for field data collection based on the state wildlife habitat scorecards	2020-2021	CPW, CNHP	In progress with CPW funds.
Action 3c) Develop a standard monitoring framework for wetland and stream restoration to promote cooperative data sharing and to improve efficiency			
Identify core data types for collection across all wetland and stream restoration projects	2021-2022	CPW, CWCB, GOCO, CDOT, SLB, CNHP	Need to consider scale (different methods for projects of different size and scale).
Develop a guide (flow chart) to currently available wetland assessment and monitoring methods	2020-2021	CNHP	
Objective 4: Secure sustainable funding for regular baseline inventory, assessment and monitoring			
Action 4a) Secure a state-level wetland appropriation to help fund regular baseline wetland data collection and updates			
Secure a state-level wetland appropriation to help fund regular baseline wetland data collection and updates	2020-2023	CNHP, various state agencies	Exploratory. Includes datasets in the future Conservation Data Explorer Tool, Potential Conservation Area updates every ~5 years, EO updates, and other core wetland services.

CORE ELEMENT 3: REGULATORY CONSIDERATIONS FOR WETLAND PROTECTION

Colorado's current wetland regulatory framework is limited to federal regulations and protecting wetlands in the context of water quality, which were recently reduced in extent by the revised definition of Waters of the U.S. (WOTUS) under the Navigable Waters Protection Rule (to be published in March, 2020). This core element includes maintaining existing wetland protections, along with identifying needs for current regulatory protection and exploring the potential for future regulatory and non-regulatory mechanisms to expand the protection of Colorado's wetland resources in the future.

Goal: Protect and restore Colorado's existing wetland areas, and the ecological functions and services they provide.

Objective 1: Ensure consistent regulatory protection for Colorado's wetlands now, and into the future

1a) Continue implementing a strong 401 certification program.

Objective 2: Fill gaps in protecting Colorado's most rare and sensitive wetland areas from degradation

2a) Explore regulatory mechanisms for wetland protection.

Objective 3: Develop tools, data, and resources to help streamline and ensure consistency in regulatory reviews of potential wetland impacts

3a) Identify key information needed to support current regulatory decision-making (e.g., source water protection, nonpoint source pollution planning, wildlife).

3b) Explore the potential for narrative and/or numerical water quality standards to protect the ecological integrity and functions of Colorado's wetlands into the future.

Related Overarching Goals in Existing Colorado State Plans

Colorado's Water Plan (State of Colorado 2015):

- *Colorado's Water Plan advocates for effective and efficient permitting in which State of Colorado agencies work together to complete their work early in the permitting process. This will provide the opportunity for State support without being pre-decisional (9.4, p. 9-34).*
- *Colorado's Water Plan promotes waters that fully support their classified uses by 2050 through strategies designed to meet Colorado's current and future consumptive, recreational, and environmental water needs. These strategies incorporate the protection and restoration of water quality as a key objective (7.3, p. 7-17).*

Regulatory Considerations for Wetland Protection			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
<i>Objective 1: Ensure consistent regulatory protection for Colorado's wetlands now, and into the future</i>			
Action 1a) Continue implementing a strong 401 certification program			
Develop consistent state approach to Interagency Review Team (IRT) participation (mitigation bank proposal review)		CPW, SLB	
Evaluate the utility of CNHP's Conservation Data Explorer to help with IRT review		CNHP , all interested agencies	Consult with Natural Heritage Programs in other states who have similar data explorers and environmental review tools RE their utility in IRT reviews.
Designate wetland candidates for State Outstanding Waters		WQCD, CNHP	Also see Conservation Restoration, and Adaptive Management Core Element, Action 1b.
<i>Objective 2: Fill gaps in protecting Colorado's most rare and sensitive wetland areas from degradation</i>			
Action 2a) Explore regulatory mechanisms for wetland protection			
Identify existing regulatory mechanisms (e.g., zoning and clean water protections) and gaps in protections for sensitive wetlands			
Propose potential mechanisms for protecting wetlands at risk of water quality, habitat, and hydrologic degradation			See Core Element 2, 1c; consider integrating CNHP element occurrences of rare species and communities into water quality protection or develop protection for developing oil and gas development in wetlands and within riparian buffers.
Discuss next steps for filling regulatory gaps following the revised definition (2020) of Waters of the U.S. under Section 404 of the Clean Water Act	2021-2022	WQCD , all interested agencies	
Explore new and expand existing programs for voluntary incentives and regulatory disincentives to maintain high-functioning wetlands in Colorado			Includes water quality, flow attenuation, habitat, and other functions provided by wetlands.

Regulatory Considerations for Wetland Protection			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Objective 3: Develop tools, data, and resources to help streamline and ensure consistency in regulatory reviews of potential wetland impacts			
Action 3a) Identify key information needed to support current regulatory decision-making (e.g., source water protection, nonpoint source pollution planning, wildlife)			
Work with state agency staff and other key wetland partners and stakeholders to develop a list of key wetland data and information needed for environmental review screening and conservation planning (IRT, etc.)	2020-2021	CNHP	Use existing Colorado Conservation Data Explorer (CODEX) funding.
Develop or refine wetland geospatial data as needed to respond to the needs of statewide wetland managers, practitioners, and planners; incorporate wetland geospatial data into statewide decision support tools like the Colorado Conservation Data Explorer	2020-2021	CNHP, WQCD, CDOT, CPW	See Inventory, Assessment, and Monitoring Core Element.
Action 3b) Explore the potential for narrative and/or numerical water quality standards to protect the ecological integrity and functions of Colorado's wetlands into the future			
Explore potential to enhance narrative standards and/or develop numerical standards for wetland water quality (chemical, physical, and biological)		WQCD, CNHP	Begin initial conversation regarding wetland standards. No target date for developing standards during the planning time period, as the process is lengthy.

CORE ELEMENT 4: PARTNERSHIPS, EDUCATION, AND OUTREACH

Public and private partnerships are critical to protecting Colorado’s diverse wetland types across land ownership and management boundaries. This core element includes building and maintaining statewide wetland partnerships, and increasing wetland fluency for all who manage and work in Colorado’s wetlands.

Goal: support and enable public and private partners working to conserve and restore wetlands across Colorado.

Objective 1: Build and maintain key wetland partnerships across Colorado

1a) Continue building and maintaining key wetland partnerships across Colorado.

Objective 2: Maintain and increase wetland fluency for people managing and working in Colorado’s wetlands

1a) Utilize a suite of wetland outreach tools to reach a broader base of land managers, landowners, policymakers, NGOs, researchers, and educators on key issues related to wetland conservation and restoration in Colorado.

1b) Provide focused wetland training (plant ID, soils, hydrology) for state agency staff and other partners.

Related Overarching Goals in Existing Colorado State Plans

Colorado State Wildlife Action Plan (CPW 2015):

- Guiding principle No. 4: *Acknowledge the pivotal role that private landowners and local stakeholders play in conservation.*
- Guiding principle No. 6: *Maintain an atmosphere of cooperation, participation, and commitment among wildlife managers, landowners, private and public land managers, and other stakeholders in development and implementation of conservation actions.*

2017-2022 Five Year Strategic Plan (CNHP 2017):

- *Goal 2: Deliver relevant conservation information through maps, data and tools.*
- *Goal 4: Promote conservation through partnership development, education, and outreach.*
 - *4.1 Foster collaboration and expand the network of conservation stakeholders.*
 - *4.2 Provide educational opportunities for current conservation professionals and the next generation.*

Partnerships, Education, and Outreach			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Objective 1: Build and maintain key wetland partnerships across Colorado			
Action 1a) Continue building and maintaining key wetland partnerships across Colorado			
Maintain wetland Focus Area Committees (FACs) comprised of federal, state, local, and NGO partners to assess regional wetland issues and prioritize restoration and conservation activities	2020-2024	CPW, USFWS, USFS, BLM, CNHP, DU, BCR	
Formalize a Colorado Wetland Council to coordinate and partner with federal, state, and local agencies as well as with conservation organizations and local citizens to enable effective statewide wetland conservation and management	2020-2024	All interested parties	
Objective 2: Maintain and increase wetland fluency for people managing and working in Colorado's wetlands			
Action 2a) Utilize a suite of wetland outreach tools to reach a broader base of land managers, landowners, policymakers, NGOs, researchers, and educators on key issues related to wetland conservation and restoration in Colorado			
Maintain and update the Colorado Wetland Information Center website, and associated mapping tools, to ensure that the site serves as a key data and information hub for the Colorado	2020-2024	CNHP	Seek dedicated funding to support CWIC and its many wetland information resources. CNHP Strategic Plan (2017) 2.3c: "Develop resource-specific websites with access to detailed information on data, reports, and resources."
Develop wetland outreach materials (e.g., fact sheets, web pages, story maps) for current and future projects	2020-2024	CNHP	
Continue to update, print, and distribute regional wetland plant pocket guides for Colorado	2020-2024	CNHP	CNHP Strategic Plan (2017) 2.3b: "Develop online and mobile field guides with detailed information on species and ecosystems."
Create and maintain a wetland social media account to share information relevant to Colorado wetlands	2020-2024	CNHP	

Partnerships, Education, and Outreach			
<i>Objectives, Actions, and Activities</i>	<i>Years</i>	<i>Partners</i>	<i>Notes and Links to Plans and Funded Projects</i>
Share stories and lessons learned from private lands conservation and stewardship on publicly available websites and other outreach materials		CWCB, CPW, all interested agencies	Also continue awards programs for private lands conservation, stewardship, and restoration.
Action 2b) Provide focused wetland training (plant ID, soils, hydrology) for state agency staff and other partners			
Offer wetland plant identification workshops at least once a year, and in different parts of the state (e.g., West Slope, Front Range)	2020-2024	CNHP, CDOT	CNHP Strategic Plan (2017) 4.2a.i: “Continue to teach wetland plant identification and wetland condition assessment workshops.” CDOT-funded courses are typically exclusive to CDOT staff.

REFERENCES

- Bostwick, P., B. Zollitsch, J. Christie, L. Stetson, M. Stelk, L. Burchill, S. Weaver. 2013. Wetland Program Plans Handbook: A resource to assist states and tribes in developing strategic approaches to achieve comprehensive wetland programs. Association of State Wetland Managers, Windham, ME. Available online: http://www.aswm.org/pdf/lib/wetland_program_plans_handbook.pdf
- Colorado Department of Public Health and Environment (CDPHE). 2011. Statewide Water Quality Management Plan. Denver, CO. Available online: <https://www.colorado.gov/pacific/cdphe/statewide-water-quality-management-plan>
- Colorado Natural Areas Program (CNAP), Colorado State Parks, and Colorado Department of Natural Resources. 1998. Native Plant Revegetation Guide for Colorado. Caring for the Land Series Volume III. Denver, CO. 209 p.
- Colorado Natural Heritage Program (CNHP). 2010. Wetland Program Plan: A Vision for Building Comprehensive Wetland Information for the State of Colorado Planning Years 2011—2015. Submitted to U.S. EPA, Region 8, Denver, CO. Available online: http://www.cnhp.colostate.edu/download/documents/2010/CNHP_Wetland_Program_Plan_-_2011-2015_-_revised.pdf
- CNHP. 2015a. Climate Change Vulnerability Assessment for Colorado Bureau of Land Management. K. Decker, L. Grunau, J. Handwerk, and J. Siemers, editors. Colorado Natural Heritage Program, Colorado State University, Fort Collins, CO. Available online: http://www.cnhp.colostate.edu/download/documents/2015/CCVA_for_Colorado_BLM_final.pdf
- CNHP. 2015b. Status Update and Addendum to Wetland Program Plan: A Vision for Building Comprehensive Wetland Information for the State of Colorado Planning Years 2011–2015. Submitted to U.S. EPA, Region 8, Denver, CO. Available online: http://www.cnhp.colostate.edu/download/documents/2015/CNHP_WPP_Status_Report_and_Addendum_2015_Dec.pdf
- CNHP. 2018. Status Update and Addendum to Wetland Program Plan: A Vision for Building Comprehensive Wetland Information for the State of Colorado Planning Years 2011–2015. Submitted to U.S. EPA, Region 8, Denver, CO. Available online: https://cnhp.colostate.edu/wp-content/uploads/download/documents/cwic_docs/misc/CNHP%20WPP%20Status%20Report%20and%20Addendum_2018%20Feb.pdf
- Colorado Parks and Wildlife (CPW). 2011. Statewide Strategies for Wetland and Riparian Conservation: Strategic Plan for the Wetland Wildlife Conservation Program. Denver, CO. Available online: <http://cpw.state.co.us/aboutus/Pages/Wetlands.aspx>
- CPW. 2019. Colorado Statewide Comprehensive Outdoor Recreation Plan. Denver, CO. Available online: <https://cpw.state.co.us/Documents/Trails/SCORP/Final-Plan/2019-SCORP-Report.pdf>
- CPW. 2015. State Wildlife Action Plan: A Strategy for Conserving Wildlife in Colorado. Denver, CO. Available online: <http://cpw.state.co.us/aboutus/Pages/StateWildlifeActionPlan.aspx>

- Environmental Protection Agency (EPA). 2009. Core Elements of an Effective State and Tribal Wetlands Program. Available online: https://www.epa.gov/sites/production/files/2015-10/documents/2009_03_10_wetlands_initiative_cef_full.pdf
- Johnson, B., M. Beardsley, and J. Doran. 2013. Colorado Department of Transportation's Functional Assesses of Colorado Wetlands (FACWet) Method. User Manual – Version 3.0. Available online: <https://www.codot.gov/programs/environmental/wetlands/facwet-version-3-manual>
- Lemly, J., L. Gilligan, and C. Wiechmann. 2016. Ecological Integrity Assessment (EIA) for Colorado Wetlands: Field Manual. Version 2.1. Colorado Natural Heritage Program, Colorado State University, Fort Collins, CO. Available online: http://www.cnhp.colostate.edu/download/documents/2016/2016_Colorado_EIA_Field_Manual_Version_2.1.pdf
- Lemy, J., G. Smith, S. Marshall, K. Decker, and D. Culver. 2020. 2020 State of Colorado's Wetlands. Colorado Natural Heritage Program, Colorado State University. Fort Collins, CO.
- McKinstry, M.C., W.A. Hubert, and S.H. Anderson (eds.) 2004. Wetland and Riparian Areas of the Intermountain West: Ecology and Management. University of Texas Press, Austin, TX.
- Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-being: Wetlands and Water Synthesis. World Resources Institute, Washington, D.C.
- Redelfs, A.E. 1980. Wetlands values and losses in the United States. M.S. thesis. Oklahoma State University, Stillwater, OK.
- Roberge, J.-M. and P. Angelstam. 2004. Usefulness of the Umbrella Species Concept as a Conservation Tool. *Conservation Biology* 18(1):76-85.
- State of Colorado. 2018. Colorado Climate Plan. Coordinated by the Colorado Water Conservation Board. Denver, CO. Available online: <http://cwcb.state.co.us/environment/climate-change/Pages/main.aspx>
- State of Colorado. 2015. Colorado's Water Plan. Coordinated by the Colorado Water Conservation Board. Denver, CO. Available online: <https://www.colorado.gov/pacific/sites/default/files/CWP2016.pdf>