



FISH AND WILDLIFE MITIGATION AND ENHANCEMENT PLAN

Prepared for:
The Colorado Parks and Wildlife Commission
in accordance with C.R.S. 37-60-122.2

Applicant:
Northern Water
acting by and through
Northern Integrated Supply Project
Water Activity Enterprise
Northern Colorado Water Conservancy District

October 10, 2017



NORTHERN INTEGRATED SUPPLY PROJECT

FISH AND WILDLIFE MITIGATION AND ENHANCEMENT PLAN

Prepared for:
The Colorado Parks and Wildlife Commission
in accordance with C.R.S. 37-60-122.2

Applicant:
Northern Water

acting by and through

**Northern Integrated Supply Project Water Activity Enterprise
Northern Colorado Water Conservancy District**

October 10, 2017

CONTENTS

CONTENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
EXECUTIVE SUMMARY	1
NORTHERN INTEGRATED SUPPLY PROJECT FISH AND WILDLIFE MITIGATION AND ENHANCEMENT PLAN	4
1.0 INTRODUCTION	4
2.0 NISP BACKGROUND	5
2.1. Glade Reservoir Complex	5
2.2. South Platte Water Conservation Project	7
2.3. Water Supplies	7
2.4. Conveyance to NISP Participants	8
2.5. Estimated Project Cost	10
2.6. Conservation	10
2.7. Supplemental Draft EIS Conceptual Mitigation Plan	12
2.8. Adaptive Management	14
3.0 OTHER CONCURRENT OR RELATED ACTIVITIES	16
3.1. Halligan and Seaman Water Supply Projects	16
3.2. Poudre Runs Through It Flows Committee	16
3.2.1. Flows	17
3.2.2. Funding	18
3.2.3. Poudre River Forum	18
3.3. City of Fort Collins Natural Resources Projects	18
3.3.1. Poudre River Downtown Master Plan	18
3.3.2. Natural Areas Master Plan	18
3.3.3. Ecosystem Response Model	19
3.3.4. Poudre River Health Assessment Framework	19
3.3.5. McMurry Natural Area Restoration Project	19
3.4. Poudre River Trail	20
3.5. Cache La Poudre River at Greeley Flood Risk Mitigation and Ecosystem Restoration	20
4.0 REGULATORY PROCESS	22
4.1. Clean Water Act Section 404 Permit	22
4.2. National Environmental Policy Act Review	22
4.3. Endangered Species Act	23
4.4. Colorado Fish and Wildlife Mitigation Plan	24

4.4.1.	Mitigation and Enhancement Plans	24
4.4.2.	Consultation, Coordination and Public Input.....	25
5.0	PROPOSED FISH AND WILDLIFE MITIGATION PLAN.....	27
5.1.	NISP Project Area	27
5.2.	Avoidance and Minimization	29
5.2.1.	Design Commitments.....	29
5.2.1.1.	NISP Configuration	30
5.2.1.2.	Poudre Valley Canal Diversion Structure (AG-04).....	30
5.2.1.3.	SPWCP Diversion Design (AG-07)	32
5.2.1.4.	Multi-Level Outlet Tower for Glade Reservoir Releases (WQ-01)	32
5.2.1.5.	Glade Reservoir Release Structure (WQ-02).....	35
5.2.2.	Operational Commitments	36
5.2.2.1.	Avoid Munroe Canal Diversions (FW-01).....	37
5.2.2.2.	Curtail Diversions for Non-Consumptive Water Rights (FW-02)	37
5.2.2.3.	Summer and Winter Diversion Curtailments (FW-03).....	39
5.2.2.4.	Conveyance Refinement (FW-04)	39
5.2.2.5.	Poudre River Flow Augmentation Protection (FW-05)	46
5.2.2.6.	Peak Flow Operations Program (FW-08)	46
5.2.2.7.	Temperature Mitigation (WQ-06).....	53
5.2.2.8.	Ramp NISP Diversions at PVC (FW-09).....	57
5.2.3.	Construction BMP Commitments	57
5.2.3.1.	Noxious Weed Control Plan (NW-01)	57
5.2.3.2.	Migrating Birds and Raptors (TW-03, TW-04, TW-05).....	59
5.3.	Compensatory Mitigation	59
5.3.1.	Aquatic Resource and Water Quality Mitigation	59
5.3.1.1.	Stream Channel and Habitat Improvement Plan (AG-01)	60
5.3.1.2.	Channel and Habitat Improvements (AG-02)	61
5.3.1.3.	Riparian Vegetation (RV-01, RV-02).....	64
5.3.1.4.	Eaton Draw Water Quality Wetlands (WQ-03).....	67
5.3.1.5.	Streamflow and Water Quality Monitoring (WQ-04)	69
5.3.1.6.	Mercury Bioaccumulation Mitigation (WQ-07)	74
5.3.2.	Terrestrial Wildlife Mitigation.....	75
5.3.2.1.	U.S. Highway 287 Realignment Design for Wildlife Protection (TW-01)	75
5.3.2.2.	U.S. Highway 287 Realignment Big Game Movement Adaptive Management Program (TW-02)	78
5.3.2.3.	Wildlife Habitat – Glade Reservoir Conservation Mitigation (TW-06).....	79
5.3.3.	Special Status Species Mitigation.....	81
5.3.3.1.	Bald Eagle (SS-02).....	81
5.3.3.2.	Colorado Butterfly Plant (SS-03)	84
5.3.3.3.	Ute Ladies Tresses Orchid (SS-04).....	84
5.3.3.4.	Platte River Target Species (SS-05)	85

5.3.3.5.	Black-footed Ferret (SS-06)	85
5.3.3.6.	Black-tailed Prairie Dog (SS-07)	85
5.3.3.7.	Swift Fox (SS-08)	86
5.3.3.8.	Burrowing Owl (SS-09)	86
5.3.3.9.	Other Riparian Species (SS-10)	87
5.3.3.10.	Bell’s Twinpod (SS-11)	87
5.3.3.11.	Townsend’s Big-Eared Bat (SS-12)	87
5.3.4.	Recreation and Public Access Mitigation	88
5.3.4.1.	Glade Reservoir and State Land Hunting Access (RC-02)	88
5.3.4.2.	Mitani-Tokuyasu State Wildlife Area and Confluence Area (RC-04, RC-05)	88
5.3.4.3.	Glade Reservoir Poudre River Recreator Parking (RC-06)	90
5.3.4.4.	Glade Reservoir Visitor’s Center (RC-07)	90
5.4.	Mitigation Costs and Schedule	90
6.0	PROPOSED FISH AND WILDLIFE ENHANCEMENT PLAN	94
6.1.	Enhancement	94
6.1.1.	Aquatic Resource Enhancement	94
6.1.1.1.	Poudre River Adaptive Management Program (AG-03)	95
6.1.1.2.	Multi-Objective Diversion Structure Retrofits (AG-05)	98
6.1.1.3.	Galeton Reservoir Native Fish Rearing (AG-08)	104
6.1.1.4.	Ramp Hansen Supply Canal Releases (FW-07)	104
6.1.1.5.	Coalition for the Poudre River Watershed (WQ-05)	105
6.1.2.	Terrestrial Resource Enhancement	106
6.1.2.1.	Wildlife Habitat – Glade Reservoir Conservation Enhancement (TW-07)	107
6.1.3.	Recreation and Public Access Enhancement	107
6.1.3.1.	Glade Reservoir Fishery (AG-06)	107
6.1.3.2.	Glade Reservoir Recreation (RC-01)	108
6.1.3.3.	Glade Reservoir Recreation and Wildlife Adaptive Management Program (RC-03)	111
6.2.	Enhancement Costs and Schedule	112
	REFERENCES	115
	APPENDIX A – FISH AND WILDLIFE MITIGATION AND ENHANCEMENT PLAN SUMMARY TABLES	1

LIST OF TABLES

Table 1. Estimated NISP Project Cost (2017 Dollars)	10
Table 2. Approximate Demarcation of Resource Study Reaches of the Cache la Poudre	28
Table 3. Decreed and Stipulated Flow Commitments by NISP for Non-Consumptive Water Rights.....	39
Table 4. Monthly Poudre River Intake Diversions.....	40
Table 5. Summary of Key Flow Criteria and Metrics	42
Table 6. Peak Flow Operations Program by Peak Flow Operational Year	48
Table 7. Peak Flow Recurrence Intervals with Peak Flow Operations Program	51
Table 8. Existing Acute and Chronic Temperature Standards for the Poudre River	56
Table 9. List of Potential Water Quality Monitoring Parameters for Initial Data Collection	73
Table 10. Summary of National Bald Eagle Management Guidelines (Activity Specific) (FHWA 2017)	83
Table 11. NISP Mitigation Plan Schedule and Cost Summary	92
Table 12. Glade Reservoir Cool Water Fishery Management Plan	108
Table 13. NISP Enhancement Plan Schedule and Cost Summary	114

LIST OF FIGURES

Figure 1. NISP Infrastructure and Features.....	6
Figure 2. Annual Weighted Gallons Per Capita per Day of Combined NISP Participants (Harvey Economics 2017)	11
Figure 3. NISP Participant GPCD as Compared with Other Similar Colorado and Western U.S. Water Providers (Harvey Economics 2017)	12
Figure 4. Adaptive Management Cycle Adopted for NISP Fish and Wildlife Mitigation Plan (Tasmania 2016)	15
Figure 5. Line Diagram of Poudre River from Munroe Canal to Fossil Creek Reservoir Outlet (Northern Water 1996)	29
Figure 6. Existing Poudre Valley Canal Diversion on Poudre River near Canyon Mouth	31
Figure 7. Glade Reservoir Release Point to Poudre River	34
Figure 8. Multi-Level Outlet Tower at Carter Lake.....	35
Figure 9. Hansen Supply Canal Discharge Structure to Poudre River	36
Figure 10. Poudre River Fish Hatchery and Recreational Minimum Flow Points (CDM Smith 2014).....	38
Figure 11. NISP Conveyance Refinement – Regional Facilities	41
Figure 12. Shields Street - Conveyance Refinement Monthly Hydrologic Analysis	43
Figure 13. Lincoln Street Gage - Conveyance Refinement Monthly Hydrologic Analysis.....	44
Figure 14. Peak Flow Operations Program Decision Tree.....	49
Figure 15. Tier Classification Using CTP Model Run 3a2 (Current Conditions with NISP)	50
Figure 16. Poudre River at Canyon Gage Average Daily Peak Flow	51
Figure 17. Poudre River at Canyon Gage 3-Day Average Daily Peak Flow.....	52
Figure 18. Poudre River Average Daily Peak Flow at Canyon, Lincoln Street and Greeley Gages	53
Figure 19. CLAFTRCO (Canyon Gage, Upstream of Hansen Canal) Temperature Gage Maximum Weekly Average Temperature Results Compared to Relevant Standards (Hydros 2014a)	54
Figure 20. HSC-PRU (Below Hansen Canal) Temperature Gage Maximum Weekly Average Temperature Results Compared to Relevant Standards (Hydros 2014a).....	54
Figure 21. Poudre Valley Canal Mitigation Reach	62
Figure 22. Watson Lake Mitigation Reach	63
Figure 23. Frank State Wildlife Area Proposed Mitigation Activities.....	66
Figure 24. Eastman Park Proposed Mitigation Activities	67
Figure 25. Eaton Draw Constructed Wetlands General Location	69
Figure 26. Potential Water Quality Monitoring Sites for Initial Data Collection.....	72
Figure 27. Movement of Mule Deer, Moose, Elk and Pronghorn Through a Wildlife Underpass in Nugget Canyon on U.S. Highway 30 west of Kemmerer, WY (Western EcoSystems 2011).....	76
Figure 28. Potential Location and Alternate Locations for Wildlife Underpass.....	77
Figure 29. Habitat Conservation Area	80
Figure 30. SPWCP Diversion Facilities (GEI 2006) and Mitani-Tokuyasu SWA.....	89
Figure 31. Existing Watson Lake Fish Hatchery Diversion.....	100
Figure 32. Existing Larimer-Weld Diversion Structure	100
Figure 33. Existing Whitney Ditch Diversion Structure	102

Figure 34. Existing B.H. Eaton Ditch Diversion Structure with Whitney Diversion in Background	102
Figure 35. Whitney and B.H. Eaton Diversions	103
Figure 36. CPRW Watershed Map (CPRW 2017)	106
Figure 37. Habitat Conservation Area Trail Buffer	110

EXECUTIVE SUMMARY

The Northern Colorado Water Conservancy District (Northern Water), acting by and through the Northern Integrated Supply Project (NISP) Water Activity Enterprise), on behalf of 15 East Slope towns, municipalities and rural domestic water providers (Participants), is pursuing NISP to provide 40,000 acre feet of new, reliable water supplies. NISP would deliver water from the Cache la Poudre (Poudre) and South Platte rivers to two new reservoirs, and deliver that water via pipelines and the Poudre River for Participants' use. The purpose of this Fish and Wildlife Mitigation and Enhancement Plan (FWMEP) is to comply with the requirements of Colorado State law (C.R.S. 37-60-122.2), including the Procedural Rules for the Wildlife Commission (Chapter 16), for NISP.

Northern Water is the applicant for a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (Corps) as part of federal regulatory compliance for NISP. In conjunction with that, the Corps is required to comply with the National Environmental Policy Act (NEPA) by preparing a Final Environmental Impact Statement (EIS) and with Section 404(b) (1) of the Clean Water Act. As part of the 404 permit process, a 401 water quality certification from the Colorado Department of Public Health and Environment is also required and is being pursued.

The FWMEP includes both a Mitigation Plan, which mitigates fish and wildlife related impacts of NISP, as well as an Enhancement Plan, which outlines fish and wildlife related environmental commitments that go above and beyond direct mitigation of project effects. The Participants are committed to comply with the mitigation measures developed as part of this FWMEP, as well as those identified in the 401 certification and the Corps' 404 permit and associated Record of Decision. It is anticipated that the compensatory mitigation measures developed through these processes will be incorporated into the Record of Decision and 404 permit issued by the Corps as conditions of the permit. It is currently envisioned that compliance with the Mitigation Plan portion of this FWMEP will be attached as permit conditions by the Corps on the Record of Decision and 404 permit, while the Enhancement Plan portion of this FWMEP will be covered under an Intergovernmental Agreement between Northern Water, on behalf of the Participants, and Colorado Parks and Wildlife (CPW).

The goal of Northern Water and the Participants through this FWMEP is to mitigate the fish and wildlife related environmental impacts identified in the Draft EIS (Corps 2008), Supplemental Draft EIS (Corps 2015) and subsequent investigations, and to improve the aquatic and riparian habitat of the Poudre River, regional wildlife habitat, and regional recreational opportunities with measures identified in the enhancement plan, while at the same time meeting the water supply needs of the Participants.

Effects on the Poudre and South Platte rivers primarily occur due to diversions and operations of the proposed Glade Reservoir, a new 170,000 acre-foot reservoir located off-channel north of Ted's Place near the mouth of the Poudre Canyon, and operations of the South Platte Water Conservation Project (SPWCP), which diverts water to a new reservoir located northeast of Greeley and exchanges this water into Glade Reservoir through two existing irrigation systems. Fish and wildlife impacts from

infrastructure construction and project operations primarily occur at and near the Glade Reservoir site, which is adjacent to state lands that provide big game and small game hunting opportunities, and at the SPWCP diversion site near the confluence of the Poudre and South Platte rivers, which is located on the existing Mitani-Tokuyasu State Wildlife Area.

Key avoidance and minimization mitigation measures described in the Mitigation Plan include NISP design commitments that avoid and minimize aquatic habitat and water quality effects; flow commitments that result in establishment of a year-round base flow in the Poudre River at all points upstream and through the City of Fort Collins (which currently experiences numerous “dry-up” points) as well as a peak flow operations program that results in no effects on peak flows or peak flow bypasses during 90 percent of years to avoid impacts that could result from diversions of those peak flows; and construction best management practices that avoid and minimize effects on wildlife and plant communities.

The compensatory mitigation portion of the Mitigation Plan includes development of a stream channel and habitat improvement plan for the Poudre River; implementing stream channel, habitat, and riparian vegetation improvements in certain reaches of the Poudre River; commitments to avoid diversions when stream water temperatures approach or exceed standards that are designed to protect fish; implementing wildlife protection measures into the design and construction of the U.S. Highway 287 realignment; conserving land around Glade Reservoir for wildlife habitat; protection of special status wildlife species during and after construction; replacing existing recreation and public access facilities at Glade Reservoir and the SPWCP forebay; and constructing new wetlands to improve water quality.

The proposed Enhancement Plan was developed in response to discussions with CPW staff, discussions with other regional governmental and non-governmental agencies, and review of comments on the Draft EIS and Supplemental Draft EIS. Key components of the Enhancement Plan include developing and funding a recreational cool water fishery at Glade Reservoir, commitments to adaptive management programs for the Poudre River and recreation surrounding Glade Reservoir, multi-objective diversion structure retrofits at existing diversion structures on the Poudre River (i.e. installation of facilities that allow fish passage and measure bypassed flow), protecting additional lands west of Glade Reservoir for wildlife habitat, and participation in the Coalition for the Poudre River Watershed.

The total project cost for NISP, including costs for mitigation and enhancement commitments in this plan and those required outside of this plan, is estimated at \$857 million. The total estimated capitalized costs of commitments in the Mitigation Plan are approximately \$40.2 million, while total estimated capitalized costs of commitments in the Enhancement Plan are approximately \$13.1 million. Capitalized costs are the sum of the capital cost plus any annual operations and maintenance costs capitalized over the life of the commitment, or 50 years for those commitments that are perpetual. The mitigation costs are exclusive of costs for other mitigation requirements that will be developed for and required by the Final EIS, 401 certification, and 404 permit.

The FWMEP was approved by the Colorado Parks and Wildlife Commission at its regularly scheduled meeting on September 7, 2017, and approved by the Colorado Water Conservation Board at its regularly

scheduled meeting on September 20, 2017. This final version of the FWMEP is identical to the Draft Final version of the FWMEP (dated August 22, 2017) approved by both the Commission and Board, with modifications made to the Consultation, Coordination and Public Input section to reflect final approvals and submittal of this final plan, and to costs for the Poudre River Adaptive Management Program shown in Table 13 consistent with verbal testimony provided to the Commission during the September 7 meeting. Minor formatting changes were also made in certain areas.